

**EPA Superfund  
Record of Decision:**

**OLD CITY OF YORK LANDFILL  
EPA ID: PAD980692420  
OU 01  
SEVEN VALLEYS, PA  
09/30/1991**

Text :

- \* RESTORATION OF THE SOIL COVER IN THE NORTHEASTERN PORTION OF REFUSE AREA #3 TO A TWO FOOT MINIMUM.
- \* OPERATION OF A GROUND WATER RECOVERY/TREATMENT SYSTEM IN BOTH REFUSE AREAS #1 AND #3 AND THE INSTALLATION OF ADDITIONAL EXTRACTION WELLS IN THESE AREAS, IF NEEDED.
- \* REMOVAL OF SEDIMENT FROM THE CONCRETE COLLECTION VAULTS WITH SUBSEQUENT DISPOSAL AT AN OFFSITE PERMITTED TREATMENT, STORAGE, OR DISPOSAL FACILITY.
- \* INSTALLATION OF A LANDFILL GAS VENTING SYSTEM TO PREVENT LANDFILL GAS MIGRATION.
- \* CONSTRUCTION OF A PERIMETER FENCE AT THE LEACHATE COLLECTION VAULTS TO PREVENT PUBLIC ACCESS.
- \* IMPLEMENTATION OF A GROUND WATER AND SURFACE WATER/SEDIMENT MONITORING PROGRAM TO ENSURE CONTINUED PROTECTION TO HUMAN HEALTH AND THE ENVIRONMENT.

#### STATUTORY DETERMINATIONS

THE SELECTED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, COMPLIES WITH FEDERAL AND STATE REQUIREMENTS THAT ARE LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE TO THE REMEDIAL ACTION, AND IS COST-EFFECTIVE.

THIS REMEDY UTILIZES PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES, TO THE MAXIMUM EXTENT PRACTICABLE, AND SATISFIES THE STATUTORY PREFERENCE FOR REMEDIES THAT EMPLOY TREATMENT THAT REDUCES TOXICITY, MOBILITY, OR VOLUME AS A PRINCIPAL ELEMENT.

BECAUSE THE SELECTED REMEDY WILL RESULT IN HAZARDOUS SUBSTANCES REMAINING ONSITE ABOVE HEALTH-BASED LEVELS, A REVIEW UNDER SECTION 121(C) OF CERCLA, 42 USC S 9621(C) WILL BE CONDUCTED WITHIN FIVE YEARS AFTER THE COMMENCEMENT OF REMEDIAL ACTION TO ENSURE THAT THE REMEDY CONTINUES TO PROVIDE ADEQUATE PROTECTION TO HUMAN HEALTH AND THE ENVIRONMENT.

EDWIN B. ERICKSON  
REGIONAL ADMINISTRATOR  
REGION III

DATE: 09/30/91

RECORD OF DECISION  
OLD CITY OF YORK LANDFILL SITE

DECISION SUMMARY

#SNL

SITE NAME, LOCATION, AND DESCRIPTION

THE OLD CITY OF YORK LANDFILL SUPERFUND SITE (THE "SITE") IS LOCATED IN A RURAL SETTING APPROXIMATELY 10 MILES SOUTH OF THE CITY OF YORK, ON SOUTH ROAD IN SPRINGFIELD TOWNSHIP, YORK COUNTY, PENNSYLVANIA (THE SITE IS SHOWN ON FIGURE 1). ACCORDING TO LOCAL TAX MAPS, THE SITE OCCUPIES A 178-ACRE TRACT OF LAND. APPROXIMATELY 56 ACRES OF THE SITE WERE ACTUALLY LANDFILLED.

A SUBSTANTIAL PORTION OF THE SITE CONSISTS OF RUGGED TERRAIN, WITH HEAVILY WOODED AREAS, THICK BRIARS AND STEEP SLOPES (OVER 260 FEET OF ELEVATION ACROSS THE SITE). THE SITE IS BOUNDED TO THE SOUTHEAST AND THE NORTHWEST BY TRIBUTARIES TO THE SOUTH BRANCH OF CODORUS CREEK (DESIGNATED HEREIN AS THE SOUTHERN AND NORTHERN TRIBUTARIES, RESPECTIVELY). THE TRIBUTARIES ARE PARTIALLY FED BY SEEPS DISCHARGING FROM THE VALLEY AND HILLSIDES NEAR THE LANDFILL.

THE SITE IS CURRENTLY USED MAINLY FOR GRAZING HORSES AND RECREATION BY A PRIVATE LANDOWNER, AND A SMALL NORTHERN SECTION OF THE SITE (NOT OVER LANDFILLED AREAS) IS LEASED TO GROW CROPS FOR ANIMAL CONSUMPTION. GRASSES AND CONIFEROUS TREES COVER MUCH OF THE FORMER LANDFILL WITH THICK BRIARS AND PRIMARILY DECIDUOUS TREES GROWING ALONG TRIBUTARY CHANNELS TOWARD CODORUS CREEK.

THE OLD CITY OF YORK LANDFILL SITE LIES WITHIN THE SURFACE DRAINAGE BASIN OF THE SOUTH BRANCH OF THE CODORUS CREEK. THE SOUTH BRANCH OF CODORUS CREEK HAS THE CLASSIFICATION WWF (WARM WATER FISHES) BY PADER. SURFACE WATER FLOW FROM THE SITE IS GENERALLY SOUTHWEST AND DRAINS INTO THE NORTHWESTERLY FLOWING SOUTH BRANCH OF CODORUS CREEK, WHICH IS SOUTHWEST OF THE SITE.

SITE-SPECIFIC DRAINAGE FEATURES CONSIST OF SEEPS EMANATING FROM VALLEYS AND HILLSIDES CONVERGING INTO TRIBUTARIES WHICH EMPTY INTO THE SOUTH BRANCH OF CODORUS CREEK (SEE PLATE 1). THE TRIBUTARIES ARE GROUND WATER FED THROUGHOUT MOST, IF NOT ALL, OF THEIR COURSES. THE TWO MAIN TRIBUTARIES WHICH DRAIN THE SITE HAVE BEEN DESIGNATED THE NORTHERN AND SOUTHERN TRIBUTARIES, BOTH OF WHICH ARE PERENNIAL. THE SOUTHERN TRIBUTARY, ORIGINATING AT AN UNNAMED SEEP APPROXIMATELY 1000 FEET SOUTH OF THE BOSER RESIDENCE, FLOWS ALONG THE SOUTHERN PROPERTY BOUNDARY OF THE SITE. AS THE SOUTHERN TRIBUTARY FLOWS TO THE SOUTHWEST, ADDITIONAL FLOW IS PROVIDED BY TRIBUTARY B, ENTERING FROM THE SOUTHEAST. IN ADDITION, EAST AND WEST SEEPS ENTER THE SOUTHERN TRIBUTARY FROM THE NORTH. A PONDED AREA WITHIN THE SOUTHERN TRIBUTARY IS LOCATED APPROXIMATELY 500 FEET UPSTREAM OF THE LOCATIONS WHERE THE EAST SEEP DRAINAGE CHANNEL AND TRIBUTARY B ENTER THE SOUTHERN TRIBUTARY. THE PONDED AREA IS APPROXIMATELY 30 FEET WIDE, 80 FEET LONG AND 8 INCHES DEEP.

THE NORTHERN TRIBUTARY FLOWS ALONG THE NORTHWESTERN SITE PROPERTY BOUNDARY AND ORIGINATES AT A SMALL SPRING-FED POND ON THE FLETCHER PROPERTY. THE NORTHERN TRIBUTARY IS ALSO FED BY TRIBUTARY D WHICH DRAINS THE CENTRAL PORTION OF THE SITE. TRIBUTARY D IS CHARACTERIZED BY SEEPS GENERALLY OCCURRING ALONG THE SOUTHERN SIDE OF ITS DRAINAGE CHANNEL. THE UPPER REACHES OF TRIBUTARY D ARE INTERMITTENT. TRIBUTARY C ENTERS THE SOUTH BRANCH OF CODORUS CREEK BETWEEN THE NORTHERN AND SOUTHERN TRIBUTARIES. TRIBUTARY C IS INTERMITTENT IN NATURE.

THE SEEPS ARE DISCUSSED SEPARATELY FROM THE STREAMS DUE TO THE NATURE AND THE PHYSICAL CHARACTERISTICS OF THE SEEPS. THE SEEPS ORIGINATE FROM THE HILLSIDES AND VALLEYS ADJACENT TO THE LANDFILLED AREAS AND, AS SUCH, CONTAIN DISSOLVED AND SUSPENDED CONSTITUENTS FROM THE LANDFILL REFUSE. THE SEEPS HAVE AN ORANGE COLORATION AS A RESULT OF IRON CONTENT, COMMONLY ASSOCIATED WITH VIRTUALLY ALL MUNICIPAL LANDFILL SEEPS AS WELL AS MANY NATURALLY OCCURRING SPRINGS. IN GENERAL, THE SEEPS ARE LOW FLOWING AND IN SOME CASES INTERMITTENT.

REGIONAL GEOLOGY

THE OLD CITY OF YORK LANDFILL SITE IS LOCATED WITHIN THE PHYSIOGRAPHIC PROVINCE KNOWN AS THE PIEDMONT SECTION OF THE APPALACHIAN MOUNTAIN CHAIN. THE PIEDMONT IS UNDERLAIN BY METAMORPHIC SEDIMENTS AND VOLCANICS OF PRECAMBRIAN AND PALEOZOIC AGE.

THE BEDROCK BENEATH THE SITE HAS BEEN MAPPED AS THE MARBURG SCHIST, A MEMBER OF THE WISSAHICKON COMPLEX. EXTENSIVE SURFICIAL WEATHERING OF THE SCHIST HAS RESULTED IN A RELATIVELY THICK SEQUENCE OF CLAYS (SAPROLITE) OVERLYING BEDROCK. THE MARBURG IS A CHLORITE SCHIST CONSISTING OF BLUISH GRAY, FINELY CRYSTALLINE, PHYLLITIC SCHIST CONTAINING CHLORITE, ALBITE, MUSCOVITE AND QUARTZ. THEREFORE, NATURAL CONCENTRATIONS OF SODIUM, ALUMINUM, POTASSIUM, MAGNESIUM AND IRON WOULD BE EXPECTED AS DISSOLVED CONSTITUENTS IN THE GROUND WATER AND IN THE COMPOSITION OF THE SAPROLITIC SOILS AND STREAM SEDIMENTS. THE MARBURG IS PREDOMINANTLY ARGILLACEOUS AND ARENACEOUS IN COMPOSITION, WITH EVIDENCE TO SUGGEST THAT IT IS AT LEAST PARTIALLY VOLCANIC. IN THE AREA

SURROUNDING THE SITE, THE ORIENTATION OF THE PLANAR FABRIC OF THE ROCK AND FORMATIONAL BOUNDARIES ARE MAPPED AS TRENDING APPROXIMATELY NORTHEAST-SOUTHWEST. IN YORK COUNTY, THE MARBURG SCHIST OCCURS AS PART OF THE MARTIC OVERTHRUST. QUARTZ VEINING IN FRACTURES IS ALSO COMMON IN THE MARBURG SCHIST. BASED ON WELL INFORMATION, THE MARBURG SCHIST IS AT LEAST 1000 FEET THICK.

#### HYDROGEOLOGY

THE MARBURG SCHIST LACKS SIGNIFICANT PRIMARY POROSITY. THE MOVEMENT OF GROUND WATER OCCURS MAINLY THROUGH POORLY DEVELOPED SECONDARY POROSITY FEATURES SUCH AS FRACTURES, JOINTS, AND PLANES OF SCHISTOSITY. THE HYDRAULIC CONDUCTIVITY OF THE FORMATION IS RELATIVELY LOW, WITH MOST WATER BEARING ZONES OCCURRING WITHIN THE UPPER 200 FEET OF THE FORMATION BECAUSE OF THE DECREASE IN FRACTURE FREQUENCY WITH DEPTH. MOST OF THE FRACTURING WITHIN THE MARBURG SCHIST OCCURS PARALLEL TO THE SCHISTOSITY RESULTING IN SIGNIFICANT ANISOTROPY IN GROUND WATER FLOW ACROSS THE SITE.

BOREHOLE PERMEABILITY TESTING (BOTH PACKER TESTS AND SLUG TESTS) WERE CONDUCTED AS PART OF THE RI. PACKER TESTING DATA MEASURED HYDRAULIC CONDUCTIVITIES RANGING FROM LESS THAN  $1.0E-04$  FEET/DAY TO 6 FEET/DAY; HOWEVER, OTHER THAN A SHALLOW ZONE TESTED IN WELL F (30 TO 66.6 FEET BELOW GRADE), THE HIGHEST HYDRAULIC CONDUCTIVITY VALUE RECORDED WAS  $1.3E-01$  FEET/DAY. IN GENERAL, THE PACKER TESTING DATA INDICATED A DECREASE IN HYDRAULIC CONDUCTIVITY WITH DEPTH RESULTING FROM A DECREASE IN FRACTURE DENSITY WITH DEPTH. SLUG TEST RESULTS REPORTED A HYDRAULIC CONDUCTIVITY OF 3.3 FEET/DAY IN WELL F WITH THE VALUES FOR THE OTHER FIVE WELLS TESTED RANGING FROM  $6.2E-01$  FT/DAY TO  $6.7E-03$  FT/DAY.

GROUND WATER EXISTS PRIMARILY UNDER UNCONFINED CONDITIONS AT THE SITE, WITH THE WATER TABLE SURFACE TYPICALLY WITHIN BEDROCK UNDERNEATH THE KNOLL AREAS AND WITHIN THE WEATHERED SCHIST IN THE RAVINES. GROUND WATER FLOW IS DOMINATED BY TOPOGRAPHY WITH RECHARGE OCCURRING IN THE UPLAND AREAS AND DISCHARGE OCCURRING IN AREAS SUCH AS SEEPS AND TRIBUTARIES TO CODORUS CREEK. GROUND WATER WITHIN THE UPPER WEATHERED ZONES OF THE BEDROCK MOVES Laterally TOWARDS LOCAL DISCHARGE AREAS AND ALSO RECHARGES DEEPER PORTIONS OF THE BEDROCK THROUGH NEAR VERTICAL FRACTURES WHICH INTERSECT THE UPPER WEATHERED AND FRACTURED BEDROCK. HOWEVER, GIVEN THE LOW FRACTURE DENSITY AND LOW PERMEABILITY OF THE MARBURG SCHIST AT DEPTH, AS WELL AS INSIGNIFICANT VERTICAL GRADIENTS, VERTICAL RECHARGE THROUGH THESE FRACTURES IS EXPECTED TO BE LOCALIZED AND OCCUR AT RELATIVELY SLOW RATES IN THE VICINITY OF THE SITE.

HORIZONTAL GRADIENTS ACROSS THE SITE ARE GENERALLY ON THE ORDER OF 0.10 FT/FT, BUT ARE ON THE ORDER OF 0.20 FT/FT ALONG STEEP SLOPES. THE GROUND WATER FLOW VELOCITIES HAVE BEEN ROUGHLY ESTIMATED TO BE IN THE RANGE OF  $1.0E-02$  FT/DAY TO 7.0 FT/DAY. SEASONAL WATER TABLE VARIATIONS HAVE BEEN OBSERVED TO BE MINIMAL.

GROUND WATER FROM THE SITE IS DOMINANTLY DISCHARGED TO THE NORTHERN AND SOUTHERN TRIBUTARIES AS WELL AS THE SEEPS. THE NORTHERN AND SOUTHERN TRIBUTARIES ARE DISCHARGE ZONES AND SERVE AS HYDRAULIC BARRIERS TO GROUND WATER FLOW IN THE UPPER PORTION OF THE BEDROCK AQUIFER AWAY FROM THE SITE ALONG THE NORTHWESTERN AND SOUTHEASTERN SITE BOUNDARIES, RESPECTIVELY. SOME AREAS OF SEEPAGE APPEAR TO BE ASSOCIATED WITH THE DISCHARGE OF GROUND WATER WITHIN THE UPPER FRACTURED AND WEATHERED BEDROCK AND APPEAR TO BE PERENNIAL (EAST SEEP, WEST SEEP, AND UNNAMED SEEP AT THE ORIGIN OF THE SOUTHERN TRIBUTARY), WHILE OTHER SEEPS APPEAR TO ORIGINATE FROM PERCHED WATER ABOVE COMPETENT ROCK AND ARE INTERMITTENT (SEEPS ALONG THE SOUTHERN BANK OF TRIBUTARY D).

#### REGIONAL GROUND WATER USAGE

UNDER THE EPA AQUIFER CLASSIFICATION SYSTEM, THE AQUIFER IN THE SITE AREA WOULD BE GIVEN A IIA CLASSIFICATION. THE IIA CLASSIFICATION INDICATES THAT THE GROUND WATER IS CURRENTLY BEING USED AS A DRINKING WATER SOURCE.

THE FOLLOWING HOMEOWNERS HAVE OR HAD DOMESTIC WATER WELLS WITHIN APPROXIMATELY 1/4 MILE OF THE SITE: BOSER, PUCILLO, GLATFELTER, K. CHILCOAT, FLETCHER (FORMERLY ROHRBAUGH), RASCOE, WINTER, C. CHILCOAT, WILLIAMSON, AND WALDMAN. THE LOCATION OF THESE HOMES ARE SHOWN ON THE MAP IN FIGURE 2, AND WITH THE EXCEPTION OF THE WALDMAN'S, ALL OF THESE RESIDENCES ARE LOCATED ALONG SOUTH ROAD. THE WALDMAN RESIDENCE IS LOCATED SOUTHWEST OF THE LANDFILL OFF PA ROUTE 616.

IN 1986, MUNICIPAL WATER SERVICE WAS EXTENDED ALONG SOUTH ROAD FOR THE USE OF THE RESIDENTS. OF THE RESIDENTS LISTED ABOVE, THE FOLLOWING RESIDENTS WERE CONNECTED TO MUNICIPAL WATER: BOSER, FLETCHER, K CHILCOAT, GLATFELTER, PUCILLO, WILLIAMSON, AND WINTER. RESIDENCES WHICH DO NOT UTILIZE MUNICIPAL WATER ARE WALDMAN AND C. CHILCOAT. THERE HAS BEEN NO HISTORICAL DOCUMENTATION OF VOCs IN THE WALDMAN WELL AND VOCs DETECTED IN THE C. CHILCOAT WELL ARE CONSIDERED TO BE UNRELATED TO THE LANDFILL. OTHER RESIDENTS CONNECTED TO MUNICIPAL WATER IN THE VICINITY OF THE SITE ARE ZIMMERMAN, KESSLER, AND SPINE. RESIDENTS WITH DOMESTIC WATER NOT SUITABLE FOR DRINKING WERE NOTIFIED BY THE PADER IN 1984 TO USE AN ALTERNATE POTABLE WATER SOURCE. IN ADDITION, THE RESIDENTS CONNECTED TO PUBLIC WATER WERE INSTRUCTED NOT TO USE THEIR WELLS AS A POTABLE WATER SOURCE BY OFFICIALS OF SPRINGFIELD TOWNSHIP. PADER (1982) RECOMMENDED TO SPRINGFIELD TOWNSHIP THAT A BUILDING MORATORIUM BE PLACED ON PROPERTIES PERIPHERAL TO THE SITE, ALTHOUGH NO FORMAL LEGISLATION HAS BEEN

ENACTED. THE RASCOE RESIDENCE WAS DESTROYED BY FIRE AND CURRENTLY THERE IS NO RESIDENCE ON THE PROPERTY.

#### LAND USE

THE LAND USE AROUND THE OLD CITY OF YORK LANDFILL PROPERTY IS GENERALLY FARMLANDS AND WOODLANDS, AND HAS REMAINED CONSISTENTLY SO THROUGHOUT THE LIFETIME OF THE LANDFILL. THE SPRINGFIELD TOWNSHIP COMPREHENSIVE PLAN (1976) DESIGNATED THE SITE PARTLY AS A RESOURCE PROTECTION AREA (SOUTHERN PORTION OF THE SITE, CLOSER TO CODORUS CREEK), AND THE REMAINDER AS RURAL HOLDING AREA. ACCORDING TO THE SPRINGFIELD TOWNSHIP COMPREHENSIVE PLAN, THE POLICY OF THE TOWNSHIP TOWARD RESOURCE PROTECTION AREAS WILL BE TO: (1) ENCOURAGE ONLY RECREATIONAL ACTIVITIES AND USES; (2) DISCOURAGE ALL OTHER DEVELOPMENTAL ACTIVITIES; (3) DELAY INDEFINITELY ANY SUBSTANTIAL IMPROVEMENT TO LOCAL ROADS; AND (4) REQUIRE PROPERTY OWNERS IN DEVELOPMENT AREAS TO PROTECT BY EASEMENT ANY PORTION OF THEIR PROPERTY DESIGNATED A RESOURCE PROTECTION AREA BY OFFERING INCENTIVES FOR PLANNED UNIT AND CLUSTER DEVELOPMENT.

THE TOWNSHIP POLICY TOWARDS RURAL HOLDING AREAS WILL BE TO: (1) ENCOURAGE DONATIONS OF LAND OR EASEMENTS TO THE COUNTY, TOWNSHIP OR APPROPRIATE NON-PROFIT GROUP; (2) CONSIDER FARMING AS THE PRIMARY LAND USE ACTIVITY AND TO TAKE NO LEGISLATIVE ACTION (THROUGH ZONING OR ANY OTHER TOWNSHIP ORDINANCE) WHICH MAY TEND TO DISCOURAGE AGRICULTURAL ACTIVITY; (3) GENERALLY PROHIBIT THE CONSTRUCTION OF NEW HOMES HERE OTHER THAN THOSE ASSOCIATED WITH AGRICULTURAL ACTIVITY; (4) PERMIT ACCESSORY COMMERCIAL ACTIVITIES UPON FARMS AS AN ADDITIONAL SOURCE FOR FARMERS; AND (5) COOPERATE WITH THE STATE AND COUNTY IN ANY PREFERENTIAL TAX PROGRAM WHICH ENABLES A FARMER TO LOWER, EITHER TEMPORARILY OR PERMANENTLY, HIS PROPERTY TAXES.

THE SITE IS ZONED AS A CONSERVATION DISTRICT AND THE PROPERTIES ADJACENT TO THE SITE HAVE BEEN ZONED AS AGRICULTURAL DISTRICTS ACCORDING TO THE SPRINGFIELD TOWNSHIP ZONING ORDINANCE (1977). THE LANDFILL PROPERTY COVERS APPROXIMATELY 178 ACRES WITH THE ACTUAL FILL AREA CALCULATED TO BE APPROXIMATELY 56 ACRES, OR 34 PERCENT OF THE SITE. THE LANDFILL CEASED OPERATING IN 1975 AND SOLD TO THE PRESENT OWNER THREE YEARS LATER. THE PROPERTY REMAINS PRIMARILY UNDEVELOPED. SOME LAND IS USED TO PASTURE HORSES AND OTHER PORTIONS YIELD SMALL CROPS OF SOYBEAN AND CORN FOR ANIMAL FEED. CROPS ARE NOT GROWN OVER LANDFILLED AREAS.

ON APRIL 9, 1991, A DEED RESTRICTION WAS PLACED ON THE ENTIRE 178 ACRE TRACT BY THE PROPERTY OWNER WHICH PREVENTS: GROUND WATER AND SURFACE WATER USAGE; FURTHER DEVELOPMENT OR SUBDIVISION OF THE PROPERTY; ADDITIONAL AREAS TO BE USED FOR AGRICULTURE; AND DISTURBANCE OF THE SURFACE SOILS FOR ANY PURPOSE EXCEPT AS REQUIRED BY THE UNITED STATES OR COMMONWEALTH OF PENNSYLVANIA.

#### MAN-MADE FEATURES

EXISTING MAN-MADE FEATURES AT THE SITE INCLUDE TWO FEATURES IDENTIFIED DURING ON-SITE WALK THROUGH RECONNAISSANCE SURVEYS. THE TWO FEATURES IDENTIFIED ARE A CONCRETE COLLECTION VAULT SYSTEM DOWNSLOPE (SOUTHWEST) OF THE WEST SEEP AND A 14" DRAINAGE PIPE DOWNSLOPE (SOUTH) OF THE EAST SEEP.

THE CONCRETE COLLECTION SYSTEM NEAR THE WEST SEEP WAS CONSTRUCTED BY A CONTRACTOR FOR THE CITY OF YORK, TO CHANNEL LEACHATE FROM THE WEST SEEP INTO EIGHT APPROXIMATELY 1000-GALLON SETTLING TANKS (COLLECTION VAULTS). THE OVERFLOW (SUPERNATANT) FROM THE COLLECTION VAULTS WAS DESIGNED TO SUBSEQUENTLY DISCHARGE THROUGH AN EIGHT INCH PIPE TO A DIVERSION BOX LOCATED APPROXIMATELY 400 FEET SOUTHWEST OF THE WEST SEEP. AT THE DIVERSION BOX, THE WATER WOULD BE DIRECTED TO TWO SUBSURFACE SEEPAGE BEDS APPROXIMATELY 500 TO 600 FEET LONG. IT IS NOT KNOWN WHETHER BOTH SEEPAGE BEDS WERE ACTUALLY INSTALLED, ALTHOUGH SOME CLAY RISER PIPES, BELIEVED TO BE FOR A SEEPAGE BED, HAVE BEEN IDENTIFIED IN THE FIELD IN THE VICINITY OF THE PROPOSED SEEPAGE BEDS.

THIS COLLECTION SYSTEM IS BELIEVED TO HAVE BEEN INSTALLED IN 1968 DURING THE OPERATIONAL PERIOD OF THE LANDFILL TO CONTROL LEACHATE IN THE AREA OF THE WEST SEEP IN ORDER TO OBTAIN A PADER PERMIT TO CONTINUE OPERATION OF THE LANDFILL.

THE SEEPAGE BED(S) DO NOT APPEAR TO BE PERFORMING AS DESIGNED, LIKELY AS A RESULT OF CLOGGING. CONSEQUENTLY, WATER IS OVERFLOWING FROM THE DIVERSION BOX AND FLOWING OVERLAND TO THE SOUTHERN TRIBUTARY.

THE SETTLING TANKS CONTAIN AN AVERAGE OF FIVE FEET OF ORANGE TINTED SEDIMENTS BELOW ORANGE TINTED WATER. WATER FLOW (ESTIMATED TO BE 5-10 GPM) WAS OBSERVED IN THE FIRST SETTLING TANK OF THE SERIES. ASSUMING THE TANKS ARE SIX FEET IN DIAMETER AND FIVE FEET OF SEDIMENT IS PRESENT IN EACH TANK, THE SEDIMENT VOLUME IN EACH TANK IS APPROXIMATELY 140 CUBIC FEET, TOTALING 1120 CUBIC FEET IN THE EIGHT SETTLING TANKS.

THE STEEL DRAINAGE PIPE PROTRUDES FROM THE WALL OF A DRAINAGE SWAIL DOWNGRADE OF THE EAST SEEP, JUST BELOW A SERVICE ROAD. FIELD INSPECTION OF THE PIPE REVEALED THAT THE PROTRUDING END OF THE PIPE WAS OPEN AND A TRICKLE OF WATER WAS DISCHARGING FROM THE PIPE TO THE DRAINAGE SWALE. IT IS BELIEVED THAT THE PIPE WAS INSTALLED TO DIVERT SURFACE DRAINAGE BENEATH THE SERVICE ROAD; HOWEVER, THE UPGRADIENT DRAIN TO THE PIPE APPEARS TO HAVE BEEN CLOGGED, RESULTING IN SURFACE DRAINAGE OVER THE SERVICE ROAD. THIS UNDERGROUND PIPE DOES NOT APPEAR TO BE PART OF ANY LEACHATE COLLECTION OR TRANSPORT SYSTEM.

#SHEA

SITE HISTORY AND ENFORCEMENT ACTIVITIES

THE OLD CITY OF YORK LANDFILL WAS OPERATIONAL FROM 1961 TO 1975 AND WAS INTENDED TO RECEIVE ONLY MUNICIPAL WASTES. THE LANDFILL WAS OWNED AND OPERATED BY THE CITY OF YORK UNTIL 1968, AT WHICH TIME THE OPERATION OF THE LANDFILL WAS TRANSFERRED TO PRIVATE FIRMS WHICH WERE UNDER CONTRACT WITH THE CITY OF YORK. MATERIAL DISPOSED OF AT THE LANDFILL WAS PREDOMINANTLY MUNICIPAL REFUSE WITH SOME COMMERCIAL AND INDUSTRIAL WASTES. THERE ARE NO RECORDS OR OTHER INFORMATION THAT ANY RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) HAZARDOUS WASTES WERE DISPOSED OF IN THE LANDFILL. THE LANDFILL WAS CLOSED IN 1975 AND THE PROPERTY WAS SOLD TO DR. ROGER AND MARY LOU BOSER IN 1978. THE BOSERS CURRENTLY OWN AND RESIDE ON THE SITE PROPERTY.

IN 1975 PADER INFORMED THE CITY THAT IT COULD NO LONGER USE ITS LANDFILL IN SPRINGFIELD TOWNSHIP. PADER ASSUMED THE RESPONSIBILITY FOR PERMITTING LANDFILL OPERATIONS IN 1971. ALTHOUGH THE OLD CITY OF YORK LANDFILL CONTINUED TO OPERATE UNTIL 1975, IT WAS NEVER PERMITTED BY PADER.

BASED ON QUESTIONS CONCERNING WATER QUALITY RAISED BY LOCAL PRIVATE RESIDENTS IN THE EARLY 1980'S, A RESIDENTIAL WELL SAMPLING PROGRAM WAS UNDERTAKEN TO ANALYZE WELL SAMPLES FOR VOLATILE ORGANIC COMPOUNDS (VOCs), METALS AND OTHER WATER QUALITY PARAMETERS. VOCs WERE REPORTED IN SIX RESIDENTIAL WELLS LOCATED ADJACENT TO THE SITE. AS A RESULT OF THE PRESENCE OF VOCs IN THESE RESIDENTIAL WELLS, A PUBLIC WATER MAIN WAS INSTALLED ALONG SOUTH ROAD FROM THE TOWN OF SEVEN VALLEYS, LOCATED 1.5 MILES NORTHWEST OF THE SITE. CURRENTLY, ELEVEN RESIDENCES ALONG SOUTH ROAD HAVE BEEN SUPPLIED WITH PUBLIC WATER.

IN SEPTEMBER 1982, PADER INSTITUTED PROCEEDINGS AGAINST THE CITY OF YORK AND DR. BOSER BY FILING AN ORDER, WHICH CHARGED THAT THE OPERATION OF, AND EXISTING CONDITIONS AT THE LANDFILL HAD CAUSED VIOLATIONS OF THE PENNSYLVANIA CLEAN STREAMS ACT. THE ORDER DIRECTED THE CITY TO CONDUCT A HYDROGEOLOGICAL ASSESSMENT OF THE LANDFILL, INCLUDING AN EVALUATION OF CONTAINMENT AND CLEANUP MEASURES. A CONSENT ORDER TO THIS EFFECT WAS ENTERED INTO BY THE CITY OF YORK AND PADER ON NOVEMBER 16, 1982.

A GROUND WATER RECOVERY AND TREATMENT SYSTEM, CONSISTING OF TWO GROUND WATER EXTRACTION WELLS (DESIGNATED AS RW-1 AND RW-2) CONNECTED TO AN AIR STRIPPING TOWER WAS INSTALLED BY A CONTRACTOR FOR THE CITY OF YORK IN THE AREA OF THE BOSER RESIDENCE BETWEEN 1987 AND JULY, 1989 AT THE REQUEST OF THE PADER BUREAU OF WATER QUALITY MANAGEMENT. THE SYSTEM HAS NOT COMMENCED OPERATION SINCE IT HAS ONLY RECENTLY RECEIVED THE NECESSARY NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT FOR OPERATION. THE SYSTEM HAS REMAINED NON-OPERATIONAL PENDING THE OUTCOME OF THE RI/FS.

UNDER THE PROVISIONS OF CERCLA, THE SITE WAS PLACED ON THE NATIONAL PRIORITIES LIST (NPL) IN DECEMBER 1982 WITH A HAZARD RANKING SCORE (HRS) OF 31.09. THE REGULATIONS ENACTED PURSUANT TO CERCLA REQUIRE THAT A REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS) AND BASELINE RISK ASSESSMENT BE CONDUCTED AT EACH NPL SITE. THE PURPOSE OF AN RI IS TO CHARACTERIZE CONDITIONS AT THE SITE. THE SUBSEQUENT FS THEN DEVELOPS, SCREENS, AND ANALYZES A SERIES OF REMEDIAL ALTERNATIVES FOR ADDRESSING CONTAMINATION AT THE SITE. ON OCTOBER, 27, 1987, THE CITY OF YORK, RITE-WAY SERVICES, AND ALLECO, INC. (ON BEHALF OF THE MACKE COMPANY AND SERVICE AMERICA CORPORATION) ENTERED INTO AN ADMINISTRATIVE ORDER ON CONSENT WITH EPA TO CONDUCT THE RI/FS FOR THE OLD CITY OF YORK LANDFILL SITE.

#HCP

HIGHLIGHTS OF COMMUNITY PARTICIPATION

THE RI/FS AND PROPOSED REMEDIAL ACTION PLAN (PROPOSED PLAN) WERE RELEASED FOR PUBLIC COMMENT AS PART OF THE ADMINISTRATIVE RECORD FILE ON JULY 19, 1991, IN ACCORDANCE WITH SECTIONS 113(K)(2)(B), 117(A), AND 121(F)(1)(G) OF CERCLA, 42 USC SS 9613 (K)(2)(B), 9617 (A), 9621 (F)(1)(G). THESE AND OTHER RELATED DOCUMENTS WERE MADE AVAILABLE TO THE PUBLIC IN BOTH THE ADMINISTRATIVE RECORD FILE LOCATED IN REGION III OFFICES AND AT THE JACOBUS LIBRARY IN JACOBUS, PENNSYLVANIA; A NOTICE OF AVAILABILITY WAS PUBLISHED IN THE YORK DISPATCH ON JULY 19, 1991. A PUBLIC MEETING TO DISCUSS THE PROPOSED PLAN WAS HELD ON JULY 30, 1991,

IN SEVEN VALLEYS, PENNSYLVANIA. EPA'S RESPONSE TO ALL COMMENTS ON THE PROPOSED PLAN AND RELATED DOCUMENTS RECEIVED DURING THE COMMENT PERIOD IS INCLUDED IN THE RESPONSIVENESS SUMMARY IN THIS ROD. IN ADDITION, A COPY OF THE TRANSCRIPT OF THE PUBLIC MEETING HAS BEEN PLACED IN THE ADMINISTRATIVE RECORD FILE AND INFORMATION REPOSITORY.

#SRRA

SCOPE AND ROLE OF RESPONSE ACTION

THERE IS NO PRINCIPAL THREAT AT THE OLD CITY OF YORK LANDFILL. PREVIOUS SITE INVESTIGATIONS HAVE DETECTED VOCs, SEMI-VOLATILE COMPOUNDS (SVOCs), AS WELL AS SOME INORGANIC CONSTITUENTS IN GROUND WATER AND SURFACE WATER ONSITE AS WELL AS IN SOME RESIDENTIAL DRINKING WATER WELLS; HOWEVER, THESE RESIDENCES NO LONGER USE THEIR WELLS FOR DRINKING WATER PURPOSES.

BASED ON A REVIEW OF CHEMICAL CONCENTRATIONS MEASURED IN GROUND WATER MONITORING WELLS ONSITE, FEDERAL AND STATE DRINKING WATER STANDARDS WERE EXCEEDED FOR THE FOLLOWING CHEMICALS (MAXIMUM DETECTED CONCENTRATIONS ARE IN PARENTHESES): 1,2-DICHLOROETHANE (8 UG/L), 1,1,2-TRICHLOROETHANE (23 UG/L), TRICHLOROETHENE (8 UG/L), AND VINYL CHLORIDE (4 UG/L). THE PROPOSED FEDERAL DRINKING WATER STANDARD WAS EXCEEDED FOR TETRACHLOROETHENE (14 UG/L).

THE PRESENCE OF THESE CHEMICALS AT THESE CONCENTRATIONS INDICATES THAT AN EXCESS LIFETIME CANCER RISK FOR POTENTIAL EXPOSURE TO GROUND WATER IS GREATER THAN THE ACCEPTABLE EPA RISK LIMITS. SINCE THERE ARE NO PRINCIPAL THREATS AT THE SITE, THE GOALS OF THE PROPOSED REMEDIAL ACTION ARE TO MINIMIZE THE POTENTIAL FOR EXPOSURE TO LANDFILL REFUSE, RECOVER AND TREAT CONTAMINATED GROUND WATER, RESTORE GROUND WATER TO BENEFICIAL USES, AND PREVENT THE SUDDEN RELEASE OF SEDIMENTS FROM THE LEACHATE COLLECTION VAULTS NEAR THE WEST SEEP.

#SSC

#### SUMMARY OF SITE CHARACTERISTICS

#### LANDFILL/SITE CHARACTERIZATION

IN ORDER TO DETERMINE THE LATERAL EXTENT AND THICKNESS OF THE LANDFILL MATERIAL, FIELD INVESTIGATIONS AND A REVIEW OF EXISTING AERIAL PHOTOGRAPHS OF THE SITE AND LANDFILL RECORDS WERE COMPLETED. THE FIELD INVESTIGATIONS CONSISTED OF A GEOPHYSICAL SURVEY AND SOIL BORINGS. A DIAGRAM PREPARED BY THE CITY OF YORK ENGINEERING DEPARTMENT DELINEATES THE SECTIONS OF THE SITE WHICH WERE LANDFILLED AND THE TIMEFRAME IN WHICH THOSE AREAS WERE FILLED (FIGURE 3).

IN SUMMARY, THE DATA COMPILED DURING THE REMEDIAL INVESTIGATION INDICATES THAT REFUSE WAS DISPOSED OF IN THREE AREAS OF THE SITE (FIGURE 4). THE APPROXIMATE EXTENT OF THESE AREAS ARE:

- \* AREA 1 IS APPROXIMATELY 5.5 ACRES IN AREAL EXTENT WITH MAXIMUM FILL THICKNESS OF 15 FEET AND AN AVERAGE FILL THICKNESS OF APPROXIMATELY 10 FEET.
- \* AREA 2 IS APPROXIMATELY 0.5 ACRES IN AREAL EXTENT WITH MAXIMUM FILL THICKNESS OF 16 FEET AND AN AVERAGE FILL THICKNESS OF APPROXIMATELY 10 FEET.
- \* AREA 3 IS APPROXIMATELY 50 ACRES IN AREAL EXTENT WITH MAXIMUM FILL THICKNESS OF 45 FEET AND AN AVERAGE FILL THICKNESS OF APPROXIMATELY 20 FEET.

THE LANDFILLED AREAS ASSOCIATED WITH THE OPERATION OF THE OLD CITY OF YORK LANDFILL ARE CURRENTLY ENTIRELY COVERED WITH SOILS WHICH ARE VEGETATED WITH GRASSES, BRUSH AND CONIFEROUS TREES. SOIL COVER MATERIAL IS BELIEVED TO CONSIST OF THE NATIVE SOILS AT THE SITE WHICH WERE SPREAD OVER THE REFUSE. SHALLOW SOIL BORINGS TAKEN DURING THE RI REVEAL THAT THE SOIL COVER IS A MINIMUM OF THREE FEET THICK IN THE NORTHERN-MOST PORTION OF THE SITE; APPROXIMATELY TWO FEET THICK IN THE SOUTHERN PORTION OF THE SITE; AND ONE TO TWO FEET THICK NEAR THE BOSER RESIDENCE (BELIEVED TO BE THE RESULT OF DIMINISHED VEGETATION DUE TO GRAZING OF HORSES IN THAT AREA AND SUBSEQUENT EROSION).

#### SURFACE SOILS

SAMPLING LOCATIONS FOR THE LABORATORY ANALYSIS OF SOIL SAMPLES WERE BASED ON THE RESULTS OF A SOIL GAS SURVEY USING A PORTABLE GAS CHROMATOGRAPH WITH A PHOTO IONIZATION DETECTOR (PID) AND SCANNING SOIL CUTTINGS FROM SHALLOW BORINGS WITH A FIELD PID. SURFACE SOIL SAMPLES FOR LABORATORY ANALYSES WERE COLLECTED AT TWELVE BIASED LOCATIONS ACROSS THE SITE BASED ON THE QUALITATIVE ASSESSMENT OF TOTAL VOC CONCENTRATIONS. NON-DETECTABLE VOC CONCENTRATIONS AND LOW TO NON-DETECTABLE SVOC CONCENTRATIONS WERE DETECTED IN SURFACE SOILS. CONCENTRATIONS OF INORGANIC CONSTITUENTS WERE GENERALLY WITHIN BACKGROUND RANGES. PESTICIDE COMPOUNDS WERE DETECTED AT SIX LOCATIONS DISTRIBUTED ACROSS THE SITE, ALL AT CONCENTRATIONS OF 0.014 MG/KG OR LESS. THE PCB AROCHLOR 1260 WAS DETECTED AT THREE SAMPLE LOCATIONS WITH A MAXIMUM CONCENTRATION OF 2.1 MG/KG.

BOTH QUALITATIVE FIELD SCREENING TECHNIQUES USED AT THE SITE WERE NOT CAPABLE OF DETECTING OR QUANTIFYING METHANE GAS. IT IS BELIEVED THAT METHANE GAS IS BEING GENERATED WITHIN THE REFUSE AREAS, AS IS COMMON IN MUNICIPAL LANDFILLS. THIS IS SUPPORTED BY VAPOR MONITORING CONDUCTED DURING THE INSTALLATION OF THE GROUND WATER RECOVERY EQUIPMENT IN RW-2 ON JULY 10, 1989. AT THAT TIME, SOIL VAPORS WERE SCANNED WITH AN ORGANIC VAPOR ANALYZER (OVA) EQUIPPED WITH A FLAME IONIZATION DETECTOR AND AN EXPLOSIMETER. AT EACH OF THE SUBSURFACE SAMPLING LOCATIONS, A READING GREATER THAN 1000 PPM (CALIBRATED TO METHANE), THE MAXIMUM LIMIT OF THE INSTRUMENT, WAS RECORDED ON THE OVA AND A READING OF 100 PERCENT OF THE LOWER EXPLOSIVE LIMIT WAS RECORDED ON THE EXPLOSIMETER. OVA AND EXPLOSIMETER READINGS WERE ALSO TAKEN IN THE AMBIENT AIR DURING THE RECOVERY WELL INSTALLATION. NO READINGS WERE DETECTED AT ANY OF THE LOCATIONS. IT SHOULD BE NOTED THAT ALL POINTS REPORTING THE ELEVATED METHANE LEVELS ARE LOCATED WITHIN OR DIRECTLY ABOVE REFUSE.

ALSO ON JULY 10, 1989, OVA AND EXPLOSIMETER READINGS WERE TAKEN THROUGHOUT THE BASEMENT OF THE BOSER RESIDENCE, INCLUDING DIRECTLY ABOVE VISIBLE CRACKS IN THE CONCRETE FLOOR. NO VAPORS WERE DETECTED ANYWHERE WITHIN THE BOSER BASEMENT.

DUE TO THE RELATIVELY PERMEABLE NATURE OF THE SOIL COVER OVER THE REFUSE, VENTING OF LOW LEVELS OF METHANE THROUGH THE COVER IS EXPECTED TO BE CONTINUALLY OCCURRING. AS A RESULT OF THE CONTINUOUS DIFFUSE RELEASE OF METHANE THROUGHOUT THE LANDFILL, IT IS UNLIKELY THAT THERE WOULD BE A SIGNIFICANT LATERAL MIGRATION OF METHANE INDUCED BY BUILD UP OF METHANE PRESSURE.

#### GROUND WATER

#### MONITORING WELLS

GROUND WATER QUALITY DATA HAS BEEN TABULATED FROM THREE ROUNDS OF SAMPLING WHICH WERE CONDUCTED IN OCTOBER AND NOVEMBER OF 1988 AND IN DECEMBER 1990 OF THE RI. THE ANALYSES REPRESENT WATER QUALITY FROM

SEVEN SHALLOW BEDROCK WELLS (1-9), FIVE DEEP BEDROCK WELLS (A-F), AND FIVE SHALLOW WELL POINTS (WP 1-5). ANALYTICAL DATA FROM WELLS 1 AND C ARE INDICATIVE OF BACKGROUND GROUND WATER QUALITY.

VOCS WERE REPORTED IN TWELVE WELLS WITH A MAXIMUM TOTAL VOC CONCENTRATION OF 382 UG/L AT WELL A. THE MOST FREQUENTLY DETECTED VOCS AND THEIR MAXIMUM REPORTED CONCENTRATIONS ARE 200 UG/L FOR 1,1-DICHLOROETHANE, 6 UG/L FOR 1,1-DICHLOROETHENE, 11 UG/L FOR 1,2-DICHLOROETHENE (TOTAL), 8 UG/L FOR TRICHLOROETHENE, 14 UG/L FOR TETRACHLOROETHENE, 23 UG/L FOR 1,1,1-TRICHLOROETHANE, AND 23 UG/L FOR 1,1,2-TRICHLOROETHANE. WELLS A AND 5, LOCATED DIRECTLY ADJACENT TO FILL AREA 1, EXHIBITED THE GREATEST NUMBER OF DIFFERENT COMPOUNDS (ELEVEN). THESE ARE ALSO THE WELLS IN WHICH THE HIGHEST CONCENTRATIONS OF TOTAL VOCS HAVE BEEN DETECTED (SEE TABLES 1-3).

OF THE MONITORING WELLS ON THE PERIMETER OF THE SITE (3,7,9,10,D,F, AND WELL POINTS (1-5)), ONLY WELL D REPORTED VOC CONCENTRATIONS GREATER THAN 4 UG/L IN SAMPLES COLLECTED DURING THE 1990 SAMPLING EVENT. WELL D REPORTED 27 UG/L TOTAL VOCS, 20 UG/L OF WHICH WAS ACETONE, A COMMON LABORATORY CONTAMINANT THAT WAS NOT CONFIRMED IN THIS WELL IN THE TWO 1988 SAMPLING ROUNDS. OF ALL THE PERIMETER WELLS, NO VOC WAS DETECTED ABOVE CURRENT MCLS. HOWEVER, TETRACHLOROETHENE WAS DETECTED IN WELL 7 ON TWO OCCASIONS (8 UG/L IN OCTOBER, 1988 AND 7 UG/L IN NOVEMBER, 1988), AT CONCENTRATIONS EXCEEDING THE PROPOSED MCL OF 5 UG/L.

CHLOROFORM WAS DETECTED IN WP-3 DURING THE OCTOBER, 1988 (10 UG/L) AND NOVEMBER, 1988 (3 UG/L) SAMPLING EVENTS BUT WAS NOT DETECTED IN THE DECEMBER 1990 SAMPLING EVENT. CHLOROFORM WAS NOT DETECTED IN ANY OTHER ONSITE SAMPLE FROM ANY MEDIUM.

FIVE SVOC COMPOUNDS WERE DETECTED IN SEVEN SEPARATE MONITORING WELLS (SEE TABLE 4). THE ONLY COMPOUND DETECTED MORE THAN ONCE IN THE SAME WELL WAS 1,4-DICHLOROBENZENE IN WELLS 2 AND 4. THE ONLY COMPOUND DETECTED ABOVE 14 UG/L WAS BIS(2-ETHYLHEXY)PHTHALATE (BEHP). BEHP WAS DETECTED IN FOUR DIFFERENT LOCATIONS ON TWO SEPARATE OCCASIONS AND ONLY DETECTED ONE TIME IN EACH WELL. THIS COMPOUND IS A COMMON LABORATORY CONTAMINANT. THE ONLY COMPOUND DETECTED IN ANY PERIMETER WELL WAS BEHP (10 UG/L) IN WP-1 ON ONE OCCASION.

THE PESTICIDE BETA-BHC WAS DETECTED AT 1.8 UG/L IN WELL A IN THE SAMPLING ROUND OF NOVEMBER 1988. THIS COMPOUND WAS NOT DETECTED IN THE PREVIOUS ROUND OF SAMPLING IN OCTOBER 1988. ALPHA AND GAMMA CHLORDANE WERE DETECTED IN THE WINTER WELL IN THE OCTOBER AND NOVEMBER 1988 SAMPLING AT CONCENTRATIONS OF 0.57 UG/L AND .034 UG/L, RESPECTIVELY. THESE PESTICIDES ARE NOT BELIEVED TO BE SITE RELATED. NO PCBs WERE DETECTED DURING ANY SAMPLING EVENT.

THE CONCENTRATIONS OF THE MAJOR CATIONS IN SITE MONITORING WELLS (SEE TABLE 5) ARE GENERALLY SIMILAR TO THOSE MEASURED IN WELLS 1 AND C (BACKGROUND WELLS). CADMIUM WAS DETECTED IN WELLS 9, F (BUT NOT IN THE DUPLICATE SAMPLE), AND WP-3 IN THE 1990 SAMPLING ROUND AT CONCENTRATIONS RANGING FROM .0052 TO .0069 MG/L. CADMIUM WAS NOT DETECTED AT ANY WELLS DURING THE TWO 1988 SAMPLING ROUNDS AND IS NOT BELIEVED TO BE A SITE-RELATED CONSTITUENT. IN THE 1990 SAMPLING, LEAD WAS DETECTED IN TWO SAMPLES (WELLS C AND 5) AT CONCENTRATIONS OF .0032 AND .0085 MG/L, RESPECTIVELY. LEAD WAS NOT DETECTED IN ANY WELLS DURING THE 1988 SAMPLING ROUNDS.

A COMPARISON OF FEDERAL DRINKING WATER STANDARDS TO OBSERVED CONCENTRATIONS OF CONTAMINANTS IN GROUND WATER FOR THE SITE MONITORING WELLS IS PRESENTED IN TABLES 6 AND 7.

#### RESIDENTIAL WELLS

HISTORICALLY, RESIDENTS LOCATED ADJACENT TO THE SITE AND THE BOSER RESIDENCE, LOCATED ON THE SITE, COMPLAINED OF OBJECTIONABLE ODORS FROM THEIR DOMESTIC WELLS. A WATER QUALITY SAMPLING AND ANALYSES PROGRAM WAS CONDUCTED BETWEEN 1981 AND 1985 AND A TOTAL OF TEN RESIDENTIAL WELLS WERE TESTED. THE RESULTS SHOWED THE PRESENCE OF VOCS IN SIX OF THE TEN RESIDENTIAL WELLS. TOTAL VOCS RANGED FROM 2 UG/L AT THE WILLIAMSON WELL TO A MAXIMUM OF 413 UG/L IN THE BOSER WELL, WHICH WAS INSTALLED THROUGH THE LANDFILL REFUSE. THE SIX

RESIDENTS WITH VOCS DETECTED IN THEIR DOMESTIC WELLS, IN ADDITION TO FOUR OTHER RESIDENCES, WERE CONNECTED TO THE SEVEN VALLEY PUBLIC WATER SUPPLY IN 1986. CURRENTLY, ONLY THE C. CHILCOAT AND WALDMAN RESIDENCES IN THE VICINITY OF THE SITE ARE NOT

CONNECTED TO PUBLIC WATER. AS PART OF THE RI, TWO OF THE TEN RESIDENTIAL WELLS (BOSER AND WINTER) WERE SAMPLED DURING THE 1988 GROUND WATER SAMPLING PROGRAM. RESIDENTIAL WELLS HISTORICALLY SAMPLED ARE SHOWN ON FIGURE 2 AND THE TOTAL VOC RESULTS PRESENTED IN TABLE 8.

TOTAL VOC DATA FOR ONSITE MONITORING WELLS 1,2,3, AND 4 HAVE ALSO BEEN INCLUDED ON TABLE 8 AS THESE WELLS HAVE BEEN HISTORICALLY SAMPLED ALONG WITH THE RESIDENTIAL WELLS. THE FOLLOWING OBSERVATIONS ARE PRESENTED ON RESIDENTIAL WATER QUALITY PRIOR TO INITIATION OF RI INVESTIGATIVE ACTIVITIES IN 1988:

- \* ALL RESIDENCES WHERE VOCS HAD BEEN HISTORICALLY OBSERVED, WITH THE EXCEPTION OF THE C.CHILCOAT RESIDENCE, HAVE BEEN CONNECTED TO PUBLIC WATER.
- \* VOCS WERE DETECTED IN SIX OF THE TEN RESIDENTIAL WELLS.
- \* VOCS WERE NOT DETECTED IN THE WALDMAN, WINTER, RASCOE, AND PUCILLO WELLS.
- \* THE ONLY VOCS DETECTED IN THE WILLIAMSON WELL WERE CHLOROFORM AND METHYLENE CHLORIDE AT LOW CONCENTRATIONS (2 AND 6 PPB, RESPECTIVELY) AND ON ONE OCCASION ONLY. METHYLENE CHLORIDE IS SUSPECTED TO HAVE BEEN THE RESULT OF LABORATORY CONTAMINATION AND CHLOROFORM IS NOT BELIEVED TO BE A SITE RELATED COMPOUND. ON THE MOST RECENT SAMPLING EVENT (12/83), NO VOCS WERE DETECTED IN THE SAMPLE FROM THIS WELL.
- \* HIGHEST TOTAL VOC CONCENTRATIONS RECORDED WERE IN THE BOSER WELL (413 UG/L), WHICH IS LOCATED BENEATH THE LANDFILL REFUSE.
- \* THE MOST COMMONLY REPORTED COMPOUNDS WERE TRICHLOROETHENE (TCE), TRANS 1,2-DICHLOROETHENE (DCE), TETRACHLOROETHENE (PCE), 1,1-DICHLOROETHANE (DCA, AND 1,1,1-TRICHLOROETHANE (TCA). THESE COMPOUNDS WERE FOUND IN THE FOUR WELLS: BOSER, ROHRBAUGH (NOW FLETCHER), GLATFELTER AND K.CHILCOAT.
- \* METHYLENE CHLORIDE, VINYL CHLORIDE, AND BENZENE HAVE ALSO BEEN SPORADICALLY DETECTED IN THE BOSER WELL.

VOCS IN THE C.CHILCOAT WELL ARE NOT BELIEVED TO BE A RESULT OF SITE ACTIVITIES BASED ON HYDROGEOLOGICAL INFORMATION AND THE NATURE OF THE CONSTITUENTS DETECTED. THE NORTHERN TRIBUTARY (A GROUNDWATER DISCHARGE AREA) FLOWS BETWEEN THE SITE AND THE C.CHILCOAT WELL. ACCORDING TO WELL CONSTRUCTION DATA, THE DEPTH OF THE C. CHILCOAT WELL IS 60 FEET. BY COMPARING THE ELEVATION OF THE BOTTOM OF THE C. CHILCOAT WELL TO THE ELEVATION OF THE NORTHERN TRIBUTARY, IT WAS DETERMINED THE ELEVATION OF THE BOTTOM OF C. CHILCOAT IS APPROXIMATELY 5 TO 10 HIGHER THAN THE NORTHERN TRIBUTARY BETWEEN THE C. CHILCOAT WELL AND REFUSE AREA 1 AND APPROXIMATELY 30 FEET HIGHER THAN THE NORTHERN TRIBUTARY BETWEEN THE C.CHILCOAT WELL AND REFUSE AREA 3, BASED ON SURVEY DATA. BASED ON THIS INFORMATION, SITE RELATED DISSOLVED CONSTITUENTS WOULD HAVE TO MOVE HYDRAULICALLY UPGRADIENT TO MIGRATE DIRECTLY FROM THE REFUSE AREAS TO THE C. CHILCOAT WELL. FURTHERMORE, THE ONLY VOCS DETECTED IN THE C. CHILCOAT WELL WERE CARBON TETRACHLORIDE AND 1,2-DICHLOROETHANE. CARBON TETRACHLORIDE WAS NOT DETECTED IN ANY OTHER WELL OR ANY OTHER MEDIUM SAMPLED IN THE STUDY AREA DURING OR PREVIOUS TO RI ACTIVITIES. 1,2-DICHLOROETHANE WAS NOT DETECTED IN ANY MONITORING WELL ON THE WESTERN PERIPHERY OF THE SITE (ROHRBAUGH, WINTER, WELL 3, WELL F AND WP-1).

VOCS HAVE NOT BEEN DETECTED IN THE GLATFELTER WELL DURING THE FIVE MOST RECENT SAMPLING EVENTS (CONDUCTED IN 1985 AND 1986). VOCS WERE NOT DETECTED IN THE ROHRBAUGH (FLETCHER) WELL IN OCTOBER, 1985 AND MAY, 1986 ALTHOUGH 11 UG/L TOTAL VOCS WAS MEASURED IN THAT WELL IN OCTOBER, 1986 (NO COMPOUNDS EXCEEDING MCLS). THESE ARE THE THREE MOST RECENT SAMPLING EVENTS FOR THE ROHRBAUGH WELL.

VOCS HISTORICALLY DETECTED IN THE K. CHILCOAT WELL MAY HAVE BEEN DRAWN INTO THE WELL THROUGH PUMPING. THE K. CHILCOAT WELL AND AREA 3 OF THE LANDFILL ARE LOCATED ALONG BEDROCK PLANES OF SCHISTOSITY. PREFERENTIAL GROUND WATER FLOW THROUGH PUMPING IS EXPECTED ALONG THIS ORIENTATION. AS MENTIONED PREVIOUSLY, THE K. CHILCOATS HAVE BEEN SUPPLIED WITH PUBLIC WATER SINCE 1986 LESSENING THE POTENTIAL FOR VOC MIGRATION TOWARD THAT WELL THROUGH ACTIVE PUMPING.

IN GENERAL, THE ANALYTICAL RESULTS FOR VOCS INDICATE A SIGNIFICANT DECREASE IN THE NUMBER OF COMPOUNDS

DETECTED AND IN CONCENTRATIONS OF THOSE COMPOUNDS BETWEEN 1981 AND 1988. THE TOTAL VOC CONCENTRATION IN THE BOSER WELL WAS CONSISTENT IN THE TWO RI SAMPLING EVENTS: 27 UG/L AND 38 UG/L, RESPECTIVELY. NO VOCS WERE DETECTED IN THE WINTER WELL ON EITHER OCCASION. IN NOVEMBER 1988, 1,4-DICHLOROBENZENE AND BIS(2-ETHYLHEXY)PHTHALATE WERE MEASURED IN THE BOSER WELL AT CONCENTRATIONS OF 1 AND 33 UG/L, RESPECTIVELY. THESE WERE THE ONLY SVOCs DETECTED AND WERE NOT REPORTED DURING THE OCTOBER 1988 SAMPLING. NO SVOCs WERE DETECTED IN THE WINTER WELL.

THE PESTICIDES ALPHA AND GAMMA-CHLORDANE WERE DETECTED IN THE WINTER WELL AT A MAXIMUM ESTIMATED CONCENTRATIONS OF 0.044-0.057 UG/L AND 0.025-0.034 UG/L, RESPECTIVELY. THESE PESTICIDES WERE NOT DETECTED DURING ANY OTHER SAMPLING EVENT IN ANY MEDIUM AND ARE NOT CONSIDERED TO BE SITE RELATED. CYANIDE AND PCBS WERE NOT DETECTED IN EITHER WELL. MERCURY WAS DETECTED IN THE WINTER WELL IN THE OCTOBER 1988 SAMPLING AT AN ESTIMATED 0.3 UG/L (BELOW THE MCL OF 3 UG/L), AND WAS NOT DETECTED IN THAT WELL DURING THE NOVEMBER 1988 SAMPLING.

#### SURFACE WATER (STREAMS & SEEPS) AND RELATED SEDIMENTS

##### SEEP WATER

TO DETERMINE IF THE LANDFILL MATERIALS HAVE AFFECTED THE SURFACE WATER AND SEDIMENT QUALITY IN THE SEEPS AND STREAMS (TRIBUTARIES) EMANATING FROM OR IN THE VICINITY OF THE SITE, SURFACE WATER AND SEDIMENT SAMPLES WERE COLLECTED AT HEADWATERS, CONVERGENCE (CONFLUENCE) POINTS, AND LOCATIONS UPSTREAM AND DOWNSTREAM OF THE SITE. WATER SAMPLES WERE COLLECTED FROM EACH OF FOUR IDENTIFIED SEEPS. AS DISCUSSED PREVIOUSLY, SEEPS REPRESENT THE DISCHARGE OF GROUNDWATER WITHIN THE UPPER PORTION OF THE BEDROCK OR PERCHED WATER ABOVE COMPETENT ROCK SURFACE, ALONG HILLSIDES OR VALLEYS ADJACENT TO LANDFILLED AREAS. SEEP WATER SAMPLES WERE COLLECTED IN TWO SAMPLING EVENTS, THE FIRST DURING 1988 AND THE SECOND IN 1990 AS PART OF THE RI (SEE TABLES 9 TO 11).

GROUNDWATER QUALITY AT WELLS 1 AND C IS CONSIDERED TO BE INDICATIVE OF BACKGROUND SEEP WATER QUALITY.

OF THE THIRTY-FOUR VOLATILE ORGANIC COMPOUNDS ANALYZED, ONLY 1,2-DICHLOROETHENE (1,2-DCE), CHLOROBENZENE, AND BENZENE WERE DETECTED. CHLOROBENZENE WAS DETECTED IN BOTH SAMPLING ROUNDS BUT AT TWO SEPARATE LOCATIONS; SPW-1 AT 20 UG/L IN 1988 AND AT SWII-3B AT 10 UG/L IN 1990. BENZENE AND 1,2-DCE WERE DETECTED ONCE AT SPW-1 IN 1988 AT 3 UG/L AND 2 UG/L, RESPECTIVELY.

OF THE SIXTY-FIVE SEMI-VOLATILE COMPOUNDS ANALYZED, ONLY SEVEN COMPOUNDS WERE DETECTED AND ALL AT LOW CONCENTRATIONS (LESS THAN 13 UG/L): 1,4-DICHLOROBENZENE, 1,2-DICHLOROBENZENE, NAPHTHALENE, N-NITROSODIPHENYLAMINE, BUTYLBENZYLPHTHALATE, AND BENZOIC ACID. FIVE OF THE DETECTED COMPOUNDS WERE REPORTED AT SPW-1 (WEST SEEP).

NO PESTICIDES OR PCBS WERE DETECTED IN ANY SEEP WATER SAMPLES.

CYANIDE WAS NOT DETECTED IN ANY OF THE SEEP WATER SAMPLES. BERYLLIUM WAS DETECTED IN ONE SAMPLE (SWII-1B) AT A CONCENTRATION OF 0.0115 MG/L IN THE 1990 SAMPLING PROGRAM. COBALT WAS DETECTED IN THREE SAMPLES (SWII-1B, 3B, 7B) AT CONCENTRATIONS RANGING FROM 0.010 TO 0.033 MG/L IN THE 1990 SAMPLING PROGRAM. COPPER WAS DETECTED IN ONE SAMPLE (SPW-2) AT A CONCENTRATION OF 0.0144 MG/L IN THE 1988 SAMPLING. COPPER WAS NOT DETECTED IN ANY OF THE 1990 SAMPLES. LEAD WAS CONFIRMED IN TWO SAMPLES (SPW-1, SPW-2) AT CONCENTRATIONS RANGING FROM 0.008 TO 0.079 MG/L IN THE 1988 SAMPLING. LEAD WAS NOT CONFIRMED TO BE PRESENT IN ANY OF THE 1990 SAMPLES. SILVER WAS DETECTED IN ONE SAMPLE (SWII-9B) AT A CONCENTRATION OF 0.003 MG/L IN THE APRIL 1990 SAMPLING. HOWEVER, SAMPLE SWII-3B, A FIELD DUPLICATE OF SWII-9B, REPORTED NON-DETECTABLE LEVELS. MERCURY WAS DETECTED IN ONE SAMPLE (SPW-2 AT THE EAST SEEP) AT A CONCENTRATION OF .0002 MG/L IN THE MAY 1988 SAMPLING, HOWEVER, IT WAS NOT DETECTED IN THE 1990 SAMPLING AT LOCATION SWII-2B (ALSO AT THE EAST SEEP). SAMPLE RESULTS FOR LOCATION SSII-7B, A SEEPAGE AREA AT THE NORTHEAST PORTION OF THE PROPERTY, GENERALLY CONTAINS SIGNIFICANTLY LESS METALS THAN SAMPLES FROM THE OTHER SEEPS (EAST AND WEST SEEPS) LOCATED AT THE SOUTHEAST PORTION OF THE SITE.

##### SEEP SEDIMENTS

SEDIMENT SAMPLES WERE COLLECTED AT OR IMMEDIATELY ADJACENT TO THE POINTS OF SEEP WATER DISCHARGE. THE RESULTS OF SEEP SEDIMENT ANALYSES ARE LISTED IN TABLES 12 TO 14 AND ARE SUMMARIZED BELOW.

OF THE THIRTY-FOUR VOLATILE ORGANIC COMPOUNDS ANALYZED FOR IN EACH SEEP SEDIMENT SAMPLE ONLY FOUR COMPOUNDS WERE DETECTED. TWO OF THE COMPOUNDS, METHYLENE CHLORIDE AND ACETONE, WERE DETECTED ONLY ONCE AND ARE COMMON LAB CONTAMINANTS. CHLOROBENZENE WAS REPORTED IN FOUR SAMPLES AND ONE DUPLICATE SAMPLE AT CONCENTRATIONS BETWEEN 0.004 MG/KG TO 0.023 MG/KG AT LOCATIONS SPS-2 (EAST SEEP), SPS-4 (UNNAMED SEEP AT ORIGIN OF SOUTHERN TRIBUTARY), SSII-9B (DUPLICATE SAMPLE OF SSII-3B COLLECTED AT THE WEST SEEP).

OF THE SIXTY-FIVE SEMI-VOLATILE COMPOUNDS ANALYZED FOR, ELEVEN COMPOUNDS WERE DETECTED, EIGHT OF WHICH

WERE REPORTED AT VALUES LESS THAN 0.34 MG/KG. TWO COMPOUNDS BENZOIC ACID AND DI-N-BUTYLPHTHALATE WERE DETECTED IN ALL THREE SAMPLES AND AT MAXIMUM CONCENTRATIONS OF 1.2 MG/KG AND 1.5 MG/KG, RESPECTIVELY. EIGHT OF THE ELEVEN COMPOUNDS WERE DETECTED ONLY AT ONE SAMPLE (SPS-4), COLLECTED AT AN UNNAMED SEEP LOCATED AT THE HEADWATERS OF THE SOUTHERN TRIBUTARY. BIS(2-ETHYLHEXYL) PHTHALATE, A COMMON LAB CONTAMINANT, WAS DETECTED AT .44 MG/KG AND 2.0 MG/KG AT THE EAST AND WEST SEEPS, RESPECTIVELY.

PESTICIDES AND PCBS WERE ABSENT IN ALL SAMPLES EXCEPT FOR LOCATION SPS-1 (WEST SEEP) WHICH REVEALED 0.29 MG/KG OF PCB AROCHLOR 1260.

CONCENTRATIONS OF IRON RANGED FROM 48,600 MG/KG (SSII-1B AT THE UNNAMED SEEP AT THE ORIGIN OF THE SOUTHERN TRIBUTARY) TO 542,000 MG/KG (SSII-7A AT THE UNNAMED SEEP ALONG TRIBUTARY D). CONCENTRATIONS OF MANGANESE RANGED FROM 493 MG/KG (SSII-2B AT THE EAST SEEP) TO 17,400 MG/KG (SSII-3C AT THE WEST SEEP). SILVER WAS DETECTED IN ALL SAMPLES COLLECTED IN 1990 RANGING IN CONCENTRATIONS FROM 1.8 MG/KG TO 22.8 MG/KG. CYANIDE WAS DETECTED AT ONLY ONE LOCATION SPS-2 (UNNAMED TRIBUTARY AT THE ORIGIN OF THE SOUTHERN TRIBUTARY) AT 11.5 MG/KG IN MAY 1988. ZINC AND LEAD CONCENTRATIONS EXCEEDED NATIONAL BACKGROUND RANGES FOR SOILS IN SEDIMENT SAMPLES AT THE EAST SEEP, DETECTED AT MAXIMUM CONCENTRATIONS RANGING FROM 527 MG/KG TO 1330 MG/KG AND 25 MG/KG TO 643 MG/KG, RESPECTIVELY.

#### STREAM WATER

WATER SAMPLES WERE COLLECTED FROM THE NORTHERN AND SOUTHERN TRIBUTARIES, STREAM A (LOCATED NORTHEAST OF THE SITE), TRIBUTARY B WHICH FEEDS THE SOUTHERN TRIBUTARY FROM THE SOUTHEAST, TRIBUTARY C WHICH INTERMITTENTLY FEEDS CODORUS CREEK FROM THE NORTH AND AT POINTS ALONG CODORUS CREEK. A SUMMARY LIST OF COMPOUNDS WHICH WERE DETECTED ARE PRESENTED IN TABLES 15 TO 17 AND ARE FURTHER DISCUSSED BELOW. BACKGROUND STREAM WATER QUALITY IS CHARACTERIZED BY WATER QUALITY IN STREAM A (SW-11 AND SW-12), TRIBUTARY B (SWII-8B AND SW-5) AND CODORUS CREEK (SW-9 AND SW-10). A COMPARISON OF BACKGROUND AND NON-BACKGROUND STREAM WATER QUALITY TO PADER AND EPA WATER QUALITY STANDARDS IS PRESENTED IN TABLE 18.

OF THE THIRTY-FOUR VOCS ANALYZED AT SIXTEEN SEPARATE LOCATIONS, ONLY SEVEN COMPOUNDS WERE DETECTED, ALL AT LOW CONCENTRATIONS. THE MAXIMUM CONCENTRATION OF ANY COMPOUND WAS 7 UG/L FOR ACETONE (A COMMON LAB CONTAMINANT). SIX OF THE SEVEN COMPOUNDS WERE FOUND IN TWO SAMPLES, SW-1 AND SW-6, WHICH ARE LOCATED ALONG TRIBUTARY D AND THE NORTHERN TRIBUTARY, RESPECTIVELY. VOCS WERE NOT REPORTED IN CODORUS CREEK OR STREAM A. SAMPLING IN 1990 DID NOT DETECT ANY VOCS.

SEMI-VOLATILE COMPOUNDS WERE ANALYZED FOR IN STREAM WATER IN ONE SAMPLING ROUND CONDUCTED IN MAY OF 1988 AND RESULTS ARE LISTED IN TABLE 16. THE RESULTS INDICATE:

- \* TWO OF TWELVE SAMPLING LOCATIONS DISPLAYED SEMI-VOLATILE COMPOUNDS.
- \* THREE SVOCS WERE DETECTED: 1,4-DICHLOROBENZENE, BEHP, AND DI-N-BUTYLPHTHALATE. SAMPLE SW-1 ALONG TRIBUTARY D SHOWED A CONCENTRATION OF 2 UG/L OF 1,4-DICHLOROBENZENE AND SW-3 REVEALED DI-N-BUTYLPHTHALATE AT 1 UG/L. SAMPLE SW-3, COLLECTED IN THE SOUTHERN TRIBUTARY, SHOWED 31 UG/L BEHP. HOWEVER, A DUPLICATE SAMPLE (SW-4) DID NOT REVEAL BEHP AND THE UPSTREAM SEEP WATER SAMPLES (SPW-2 AND 4) DID NOT REVEAL BEHP. THE BEHP IS LIKELY A LAB CONTAMINANT. SAMPLE LOCATIONS SW-2 AND SW-6 (LOCATED IN THE SOUTHERN AND NORTHERN TRIBUTARIES, RESPECTIVELY) LOCATED DOWNSTREAM OF THE LOCATIONS REPORTING SVOCS SHOWED NO DETECTION OF ANY SVOC. SIMILARLY, CODORUS CREEK AND STREAM A REPORTED NO SVOCS.

TWELVE STREAM WATER SAMPLES WERE ANALYZED FOR TWENTY PESTICIDE COMPOUNDS AND SEVEN PCB AROCHLORS. ANALYTICAL RESULTS INDICATE:

- \* ONLY ONE PESTICIDE (4,4-DDT) WAS REPORTED AND NO PCB COMPOUNDS WERE DETECTED. THE ESTIMATED .047 UG/L (4,4'-DDT) IN SW-3 FIELD DUPLICATE (SW-4) DID NOT CONFIRM THE PRESENCE OF THE COMPOUND.

THE RESULTS OF THE TOTAL METAL AND CYANIDE ANALYSES ARE PRESENTED ON TABLE 17. TOTAL IRON WAS MEASURED AT 1.57 MG/L IN THE NORTHERN TRIBUTARY (SWII-5B) WHICH EXCEEDS THE CHRONIC PADER AND EPA CHRONIC WATER QUALITY CRITERIA (1.5 MG/L AND 1.0 MG/L RESPECTIVELY). HOWEVER, THE NEXT DOWNSTREAM SAMPLING LOCATION (SWII-6B) FROM SWII-5B REVEALED AN IRON CONCENTRATION OF 0.562 MG/L BELOW THE WATER QUALITY CRITERIA. PADER AND EPA WATER QUALITY CRITERIA FOR LEAD IS HARDNESS DEPENDENT (REFER TO TABLE 18). PAPER AND EPA HARDNESS ADJUSTED CHRONIC WATER QUALITY CRITERIA IS EXCEEDED FOR LEAD AT SW-7 (CRITERIA = 2.86 UG/L, OBSERVED = 5.5 UG/L), SW-9

(CRITERIA = .82 UG/L, OBSERVED = 6.7 UG/L), SW-10 (CRITERIA = .82 UG/L, OBSERVED = 7.1 UG/L), AND SW-11 (CRITERIA = .82 UG/L, OBSERVED = 10.7 UG/L). AS NOTED PREVIOUSLY, LOCATIONS SW-9, SW-10 AND SW-11 ARE BACKGROUND SAMPLING LOCATIONS; THEREFORE, THE OCCURRENCE OF LEAD IN STREAM WATER IS NOT CONSIDERED TO BE SITE RELATED.

PADER AND EPA CHRONIC WATER QUALITY CRITERIA FOR CYANIDE (4 UG/L AND 2.5 UG/L, RESPECTIVELY) WERE EXCEEDED AT SW-3 (ESTIMATED CONCENTRATION OF 20 UG/L), HOWEVER CYANIDE WAS NOT DETECTED IN THE DUPLICATE SAMPLE AND WAS NOT DETECTED IN ANY OTHER STREAM WATER SAMPLES. OTHER THAN LEAD, NO METALS OR CYANIDE WERE REPORTED IN CODORUS CREEK OR STREAM A (ANALYSES COMPLETED FOR PRIORITY POLLUTANT METALS ONLY). ZINC WAS DETECTED AT AN ESTIMATED RANGE OF CONCENTRATIONS .007-014 MG/L IN THREE SAMPLES.

#### STREAM SEDIMENTS

STREAM SEDIMENT ANALYSES CONSISTED OF 3 SAMPLING EVENTS, ONE IN 1988 AND TWO IN 1990. AS PART OF THE OCTOBER 1990 SEDIMENT SAMPLING ROUND, TWO SAMPLES WERE COLLECTED FROM SURFACE WATER LOCATIONS OTHER THAN THE TRIBUTARIES. SAMPLE SS-21, WAS COLLECTED FROM A SMALL PONDED SEEPAGE AREA APPROXIMATELY 100 FEET SOUTH OF THE NORTHERN TRIBUTARY, NEAR THE CODORUS CREEK FLOOD PLAIN. SAMPLE SS-25 WAS COLLECTED FROM A SEEPAGE AREA IN THE BANK OF THE CODORUS CREEK, NEAR WHERE THE SOUTHERN TRIBUTARY ENTERS CODORUS CREEK. BACKGROUND STREAM SEDIMENT QUALITY IS INDICATED BY SAMPLING LOCATIONS WITHIN TRIBUTARY B (SSII-8A, SSII-8B AND SSII-8C) WHICH DOES NOT RECEIVE DRAINAGE FROM THE SITE. THE RESULTS OF THE STREAM SEDIMENT SAMPLING PROGRAMS ARE LISTED IN TABLES 19 TO 21. VOCS WERE DETECTED AT LOW CONCENTRATIONS AT SIX LOCATIONS. A TOTAL OF FOUR COMPOUNDS WERE DETECTED. METHYLENE CHLORIDE AND/OR ACETONE (COMMON LAB CONTAMINANTS) WERE THE ONLY VOCS DETECTED IN FOUR OF THE SIX STREAM SEDIMENT SAMPLE LOCATIONS AT MAXIMUM LEVELS OF 0.036 MG/KG AND 0.089 MG/KG, RESPECTIVELY. 2-BUTANONE, ALSO A COMMON LAB CONTAMINANT, WAS DETECTED IN SAMPLE SS-27 AND 25 AT ESTIMATED VALUES OF 0.007 MG/KG AND 0.031 MG/KG, RESPECTIVELY. THE ONLY VOC DETECTED IN STREAM SEDIMENTS WHICH IS NOT COMMONLY ASSOCIATED WITH LABORATORY CONTAMINATION WAS CHLOROBENZENE IN ONE SAMPLE IN 1988 (SS-1 IN TRIBUTARY D), AT AN ESTIMATED CONCENTRATION OF 0.015 MG/KG.

OF THE SIXTY-FOUR SVOC COMPOUNDS ANALYZED FOR IN EACH SAMPLE, A TOTAL OF ONLY SEVEN SVOC COMPOUNDS WERE DETECTED IN THE SEDIMENTS. TRIBUTARY D REVEALED FIVE OF THE SEVEN TOTAL COMPOUNDS. DI-N-BUTYLPHTHALATE OCCURRED WITH THE GREATEST FREQUENCY, PRESENT IN FOUR OF THE FIVE TRIBUTARY SEDIMENT SAMPLES. SAMPLE SS-28, OBTAINED FROM THE SMALL PONDED AREA IN THE SOUTHERN TRIBUTARY, REVEALED TWO SVOCS, HOWEVER, A DUPLICATE SAMPLE (SS-27) DID NOT REVEAL ANY SVOCS. SAMPLE SS-25, COLLECTED FROM THE BANK OF CODORUS CREEK, REPORTED FOUR SVOCS RANGING IN CONCENTRATIONS FROM 0.43 TO 0.82 MG/KG. THE ONLY SVOCS COMMON WITH THE SVOCS OBSERVED IN THE STREAM SEDIMENTS ARE 4-NITROPHENOL AND BEHP.

PESTICIDES AND PCBS WERE NOT DETECTED IN ANY STREAM SEDIMENT SAMPLES COLLECTED IN 1988. THE FOLLOWING COMPOUNDS WERE DETECTED IN ONLY ONE SAMPLE SS-25, ON THE BANK OF CODORUS CREEK, IN THE 1990 SAMPLING: ENDOSULFAN SULFATE AT 0.11 MG/KG AND PCB AROCHLOR 1260 AT 1.6 MG/KG.

#### LEACHATE COLLECTION VAULT SYSTEM

LOCATED AT THE WEST SEEP IS A LEACHATE COLLECTION SYSTEM DESIGNED TO COLLECT LEACHATE DISCHARGING FROM THE WEST SEEP AND PROVIDE RETENTION TIME TO ALLOW SETTLING OUT OF SUSPENDED PARTICLES AND PRECIPITATES. CLARIFIED LEACHATE IS SUBSEQUENTLY DIRECTED INTO A SEEPAGE BED(S) VIA A DIVERSION BOX SYSTEM. TO BETTER CHARACTERIZE DISCHARGE FROM THE WEST SEEP, AT THIS LOCATION, WATER AND SEDIMENT SAMPLES WERE COLLECTED FROM THE FIRST VAULT IN THE SYSTEM AND THE DIVERSION BOX DURING BOTH INITIAL AND SUPPLEMENTAL PHASES OF THE RI. ANALYTICAL PARAMETERS FOR 1988 SAMPLING EVENTS INCLUDED VOCS, SVOCS, PESTICIDES, PCBS, AND PRIORITY POLLUTANT METALS. ANALYTICAL-PARAMETERS FOR THE 1990 SAMPLING EVENT WERE TOTAL TAL METALS, BOD, COD, AND LEACHATE PARAMETERS. IN ADDITION, AN EXTRACTION PROCEDURE TOXICITY (EPTOX) ANALYSES WAS CONDUCTED ON SEDIMENTS CONTAINED WITHIN THE COLLECTION VAULT.

TABLE 22 REPORTS POSITIVE IDENTIFICATION OF COMPOUNDS DETECTED IN BOTH WATER AND SEDIMENT FROM THE VAULT AND DIVERSION BOX AND INDICATES THE FOLLOWING: LOW LEVELS OF CHLOROBENZENE, XYLENES, 1,2-DICHLOROETHENE, AND ACETONE WERE DETECTED, RANGING FROM 0.002 TO 0.006 MG/L IN WATER AND 0.025 TO 0.15 MG/KG IN SEDIMENTS.

TABLE 22 REPORTS POSITIVE IDENTIFICATIONS OF SVOCS DETECTED IN WATER AND SEDIMENT AND INDICATE THE FOLLOWING: 1,4-DICHLOROBENZENE AT 7 UG/L, NAPHTHALENE AT 3 UG/L, AND DI-N-BUTYLPHTHALATE AT 1 UG/L WERE DETECTED IN DIVERSION BOX WATER. DI-N-BUTYLPHTHALATE WAS MEASURED IN THE VAULT SEDIMENT AT 14 MG/KG AND IN THE DIVERSION BOX SEDIMENT AT 3 MG/KG. BENZOIC ACID AND BEHP WERE ALSO DETECTED IN THE DIVERSION BOX SEDIMENT AT 1.3 AND 0.98 MG/KG, RESPECTIVELY.

THE ONLY PESTICIDE OR PCB DETECTED WAS THE PESTICIDE ENDRIN, AT A CONCENTRATION OF 0.030 MG/KG IN SEDIMENT FROM THE VAULT SAMPLE COLLECTED IN 1988.

TABLE 23 REPORTS METALS AND CYANIDE CONCENTRATIONS IN SEDIMENT AND WATER FROM THE VAULT SYSTEM. DATA COLLECTED BETWEEN 1988 AND 1990 INDICATES: AN ANALYSES OF THE SUPERNATANT WATER OF A VAULT SEDIMENT SAMPLE

(AFTER SEDIMENT HAD SETTLED) REPORTED A TOTAL IRON CONCENTRATION OF 11,800 MG/L. HOWEVER, A WATER SAMPLE FROM THE SAME LOCATION COLLECTED IN 1990 (WITH LESS SUSPENDED MATERIAL) WAS SIGNIFICANTLY LESS AT 37.1 MG/L OF TOTAL IRON. A SEDIMENT SAMPLE FROM THE VAULT WAS REPORTED TO CONTAIN 453,000 MG/KG OF IRON OR 45.3 PERCENT OF THE SAMPLE BY WEIGHT.

EPTOX ANALYTICAL RESULTS FROM A VAULT SEDIMENT SAMPLE COLLECTED IN 1990 SHOW NO HERBICIDES, PESTICIDES, OR PCBS. BARIUM AT 6.83 MG/L WAS THE ONLY COMPOUND DETECTED BY THE ANALYSIS AND IS AT A CONCENTRATION WELL BELOW THE EPTOX "LIMIT" OF 100 MG/L, (EPTOX HAS SINCE BEEN REPLACED BY THE TOTAL CHARACTERISTIC LEACHING PROCEDURE (TCLP)). THE SEDIMENT IS NOT A RCRA HAZARDOUS WASTE ON THE BASIS OF TOXICITY CHARACTERISTICS OR THE OTHER RCRA HAZARDOUS WASTE CHARACTERISTICS.

#### ECOLOGY

ECOSYSTEMS IDENTIFIED AND EVALUATED DURING THE RI INCLUDE WETLANDS, PRIMARY GROWTH AND TRANSITIONAL WOODLANDS. NO FLORA OR FAUNA SPECIES OF SPECIAL CONCERN OR PROTECTION (THREATENED, RARE, ENDANGERED) WERE IDENTIFIED IN THE FIELD OR ARE RECORDED ON PENNSYLVANIA NATURAL DIVERSITY INVENTORY FILES WITHIN THE STUDY AREA.

A FISHERY AND BENTHIC SURVEY OF THE PORTIONS OF THE NORTHERN AND SOUTHERN TRIBUTARIES AND CODORUS CREEK INDICATES THAT THESE FAUNA DO NOT APPEAR TO BE IMPACTED BY THE PRESENCE OF THE LANDFILL. AN OBSERVED DECREASE IN FISH DIVERSITY AND BENTHIC MACRO INVERTEBRATES IN THE UPPER REACHES OF THE TRIBUTARIES WAS CONSISTENT WITH THE PATTERNS OBSERVED IN OTHER STREAM SYSTEMS NOT INFLUENCED BY ANTHROPOGENIC ACTIVITIES.

A WETLANDS SURVEY OF THE STUDY AREA IDENTIFIED SEVEN AREAS DISPLAYING PHYSICAL CHARACTERISTICS OF WETLAND AREAS. FIVE OF THESE WETLAND AREAS ARE NARROW BANDS OF RIPARIAN WETLANDS ASSOCIATED WITH LOCAL WATER COURSES. THE TWO REMAINING WETLAND AREAS ARE LOCATED ALONG THE FLOODPLAIN OF CODORUS CREEK IN THE VICINITY OF WHERE THE NORTHERN AND SOUTHERN TRIBUTARIES ENTER THE FLOODPLAIN.

STRESSED VEGETATION WAS OBSERVED IN FIVE LOCATIONS WITHIN THE STUDY AREA, ENCOMPASSING A TOTAL OF APPROXIMATELY 0.72 ACRES (SEE FIGURE 5). A TOTAL OF APPROXIMATELY 0.55 ACRES OF STRESSED VEGETATION WAS IDENTIFIED ONSITE WHICH REPRESENTS 0.3 PERCENT OF THE SITE. ONSITE AREAS OF STRESSED VEGETATION CONSIST OF THREE AREAS ASSOCIATED WITH IRON RICH SEEPAGE, AND ONE AREA (AREA 2) IS BELIEVED TO BE THE RESULT OF PHYSICAL DISTURBANCE AND/OR DEPOSITION OF SOILS BY MOTORIZED EQUIPMENT. AREA 5 IS LOCATED ON THE FLOODPLAIN OF CODORUS CREEK AND NOT ASSOCIATED WITH IRON STAINED SOILS.

NO WILDLIFE REFUGES OR SANCTUARIES HAVE BEEN IDENTIFIED WITHIN A ONE MILE RADIUS OF THE SITE. ADDITIONALLY, NO HISTORICAL OR ARCHEOLOGICAL SITES HAVE BEEN RECORDED ON OR WITHIN A ONE MILE RADIUS OF THE SITE.

#### #SSR

##### SUMMARY OF SITE RISKS

##### INDICATOR CHEMICAL SELECTION

BASED ON SAMPLING RESULTS AND A REVIEW OF THE SUMMARIZED DATA, CHEMICALS IDENTIFIED AS POTENTIALLY SITE-RELATED WERE SELECTED FOR FURTHER EVALUATION IN THE RISK ASSESSMENT. THE CRITERIA FOR SELECTION INCLUDED PRESENCE IN ENVIRONMENTAL MEDIA ABOVE BACKGROUND AND/OR BLANK CONCENTRATIONS.

SEVERAL POTENTIALLY SITE-RELATED COMPOUNDS WERE ELIMINATED FROM FURTHER EVALUATION BASED ON WEIGHT OF EVIDENCE CONSIDERATIONS, INCLUDING:

- (A) LOW TOXICITY,
- (B) INFREQUENT AND INCONSISTENT DETECTION IN INDIVIDUAL MEDIA AND ACROSS MEDIA,
- (C) INFREQUENCY OF DETECTION {ITEM (B)}, COUPLED WITH NO RISK-BASED CONCENTRATION FOR AN EXPOSURE SCENARIO ASSOCIATED WITH THE SPECIFIC MEDIUM OF INTEREST, AND LOW DETECTED CONCENTRATIONS COMPARED TO RBCS FOR OTHER EXPOSURE SCENARIOS.

SAMPLE CONCENTRATIONS OF INORGANIC CHEMICALS WERE COMPARED WITH THOSE LEVELS CONSIDERED TO BE NATURALLY OCCURRING IN THE REGION; IF THE DETECTED LEVELS WERE ELEVATED ABOVE BACKGROUND, THE CHEMICAL WAS CONSIDERED FOR FURTHER EVALUATION IN THE ASSESSMENT.

BASED ON A REVIEW OF THE OLD CITY OF YORK LANDFILL RI/FS DATA, A SET OF CHEMICALS OF POTENTIAL CONCERN HAS BEEN SELECTED FOR DETAILED EVALUATION IN THE RISK ASSESSMENT. THE OVERALL RESULTS OF THE INDICATOR CHEMICAL SELECTION PROCESS IS SUMMARIZED IN TABLE 24.

#### EXPOSURE PATHWAYS

THIS STEP IN THE RISK ASSESSMENT PROCESS INVOLVES DETERMINING THE POTENTIAL ROUTES OF EXPOSURE TO THE HUMAN POPULATION, THE ESTIMATED CONCENTRATIONS TO WHICH THE POPULATION IS EXPOSED, AND THE POPULATION AT RISK. THE BASELINE RISK ASSESSMENT AT THE OLD CITY OF YORK LANDFILL SITE CONSIDERED THE POTENTIAL EXPOSURE ROUTES WHICH INCLUDED: (1) DERMAL CONTACT WITH SOIL, GROUNDWATER (I.E. SHOWERING), AND STREAM SEDIMENTS; (2) INCIDENTAL INGESTION OF SOIL; (3) INGESTION OF GROUND WATER AND (4) INHALATION OF DUST AND INHALATION OF VAPORS FROM GROUND WATER.

#### TOXICITY ASSESSMENT

THE TOXICITY ASSESSMENT IS THE COMPONENT OF THE RISK ASSESSMENT PROCESS WHICH QUALITATIVELY AND QUANTITATIVELY EVALUATES THE POTENTIAL FOR CHEMICAL COMPOUNDS TO INDUCE ADVERSE HEALTH EFFECTS IN EXPOSED POPULATIONS.

CANCER POTENCY FACTORS (CPFS) HAVE BEEN DEVELOPED BY EPA'S CARCINOGENIC RISK ASSESSMENT VERIFICATION ENDEAVOR (CRAVE) FOR ESTIMATING EXCESS LIFETIME CANCER RISKS ASSOCIATED WITH EXPOSURE TO POTENTIALLY CARCINOGENIC CHEMICALS. CPFS, WHICH ARE EXPRESSED IN UNITS OF (MG/KG-DAY)<sup>-1</sup>, ARE MULTIPLIED BY THE ESTIMATED INTAKE OF A POTENTIAL CARCINOGEN, IN MG/KG-DAY, TO PROVIDE AN UPPER-BOUND ESTIMATE OF THE EXCESS LIFETIME CANCER RISK ASSOCIATED WITH EXPOSURE AT THAT INTAKE LEVEL. THE TERM "UPPER BOUND" REFLECTS THE CONSERVATIVE ESTIMATE OF THE RISKS CALCULATED FROM THE CPF. USE OF THIS APPROACH MAKES UNDERESTIMATION OF THE ACTUAL CANCER RISK HIGHLY UNLIKELY. CANCER POTENCY FACTORS ARE DERIVED FROM THE RESULTS OF HUMAN EPIDEMIOLOGICAL STUDIES OR CHRONIC ANIMAL BIOASSAYS TO WHICH ANIMAL-TO-HUMAN EXTRAPOLATION AND HIGH-TO-LOW DOSE EXTRAPOLATION HAVE BEEN APPLIED.

REFERENCE DOSES (RFDs) HAVE BEEN DEVELOPED BY EPA FOR INDICATING THE POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM EXPOSURE TO CHEMICALS EXHIBITING NONCARCINOGENIC EFFECTS. RFDs ARE EXPOSURE LEVELS FOR HUMANS, INCLUDING SENSITIVE INDIVIDUALS, THAT ARE LIKELY TO BE WITHOUT AN APPRECIABLE RISK OF ADVERSE HEALTH EFFECTS. ESTIMATED INTAKES OF CHEMICALS FROM ENVIRONMENTAL MEDIA (E.G., THE AMOUNT OF A CHEMICAL INGESTED FROM CONTAMINATED DRINKING WATER) CAN BE COMPARED TO THE RFD. RFDs ARE DERIVED FROM HUMAN EPIDEMIOLOGICAL STUDIES OR ANIMAL STUDIES TO WHICH UNCERTAINTY FACTORS HAVE BEEN APPLIED (E.G., TO ACCOUNT FOR THE USE OF ANIMAL DATA TO PREDICT EFFECTS ON HUMANS). THESE UNCERTAINTY FACTORS HELP ENSURE THAT THE RFDs WILL NOT UNDERESTIMATE THE POTENTIAL FOR ADVERSE NONCARCINOGENIC EFFECTS TO OCCUR.

POTENTIAL CONCERN FOR NONCARCINOGENIC EFFECTS OF A SINGLE CONTAMINANT IN A SINGLE MEDIUM IS EXPRESSED AS THE HAZARD QUOTIENT (HQ) (OR THE RATIO OF THE ESTIMATED INTAKE TO THE REFERENCE DOSE). BY ADDING THE HQs FOR ALL CONTAMINANTS WITHIN A MEDIUM OR ACROSS ALL MEDIA TO WHICH A GIVEN POPULATION MAY REASONABLY BE EXPOSED, THE HAZARD INDEX (HI) IS GENERATED.

A SUMMARY OF THE TOXICOLOGICAL INDICES OF THE INDICATOR CHEMICALS IS PRESENTED IN TABLE 25.

#### RISK CHARACTERIZATION

RISK CHARACTERIZATION IS THE FINAL STEP IN THE BASELINE RISK ASSESSMENT. RESULTS OF THE TOXICITY AND EXPOSURE ASSESSMENTS ARE COMBINED TO QUANTIFY POTENTIAL CARCINOGENIC AND NONCARCINOGENIC HEALTH EFFECTS. THE RISKS ARE THEN COMBINED ACROSS EXPOSURE PATHWAYS TO ESTIMATE A CUMULATIVE POTENTIAL RISK FOR THE RECEPTOR (SEE TABLE 26).

THE INDIVIDUAL EXPOSURE PATHWAY ASSOCIATED WITH THE LARGEST THEORETICAL, UPPER-BOUND, INCREMENTAL CANCER RISK IS EXPOSURE (I.E., DERMAL CONTACT, INGESTION, AND INHALATION OF VAPORS) TO ONSITE GROUND WATER. REASONABLE MAXIMUM EXPOSURE OVER A LIFETIME TO VOLATILE ORGANIC COMPOUNDS IN ONSITE GROUND WATER COULD RESULT IN AN INCREASED RISK OF 5.36E-04 ( I.E., NO MORE THAN 5 EXCESS CANCERS PER 10,000 EXPOSED PEOPLE) FOR THE RESIDENTIAL CHILD OR 4.84E-04 FOR THE RESIDENTIAL ADULT. UPPERBOUND RISKS ASSOCIATED WITH POTENTIAL EXPOSURE BY ONSITE RECEPTORS TO MEDIA OTHER THAN GROUND WATER RESULT IN CUMULATIVE RISKS OF 3.9 IN A MILLION (CHILD) AND 1.5 IN A MILLION (ADULT). THESE RISK ESTIMATES ARE ASSOCIATED WITH PCBs IN SURFACE SOIL AT AN EXPOSURE POINT CONCENTRATION OF LESS THAN 0.5 MG/KG.

THEORETICAL RISKS FOR OFFSITE RECEPTORS ARE ALSO ASSOCIATED ALMOST EXCLUSIVELY (GREATER THAN 99 PERCENT OF THE TOTAL RISK) WITH GROUND WATER EXPOSURE PATHWAYS. THE CUMULATIVE RISK FOR THE COMBINED CHILD-ADULT RECEPTOR IS 1.0E-04. OFF SITE RISKS ARE BASED ON GROUND WATER CONCENTRATIONS IN THE D/7 WELL PAIR ONLY.

TABLE 27 PRESENTS THE POTENTIAL NONCARCINOGENIC TOXICITY ESTIMATES FOR EACH RECEPTOR, BY PATHWAY, BY INDIVIDUAL COMPOUND. IN ADDITION, CUMULATIVE ESTIMATES OF HAZARDS ARE CALCULATED FOR EACH RECEPTOR ACROSS

PATHWAYS (TABLE 27). ALL ESTIMATES OF HAZARDS FOR INDIVIDUAL COMPOUNDS AND ACROSS PATHWAYS, ARE LESS THAN ONE, I.E., ESTIMATED INTAKE LEVELS ARE BELOW THOSE CONSIDERED SAFE. THE HAZARD QUOTIENT FOR INGESTION OF GROUND WATER FROM WELL PAIR A/5 IS 0.2. ALL THE INDIVIDUAL COMPOUNDS EVALUATED OVER ALL POTENTIAL EXPOSURE PATHWAYS, OTHER THAN INGESTION OF GROUND WATER, WERE ASSOCIATED WITH A HAZARD INDEX OF LESS THAN 0.2.

#### POTENTIAL ENVIRONMENTAL IMPACTS

THE OVERALL OBJECTIVE OF THE ENVIRONMENTAL EVALUATION IS TO ASSESS THE POTENTIAL EFFECTS OF CHEMICALS OF CONCERN FROM THE OLD CITY OF YORK LANDFILL ON PLANTS AND ANIMALS WHICH OCCUR WITHIN THE STUDY AREA.

ENVIRONMENTAL EXPOSURE POINTS OF CONCERN AT THE SITE INCLUDE THE SURFACE SOILS, STREAM SEDIMENTS AND STREAM WATER. OTHER MEDIA SAMPLED INCLUDE THE COLLECTION VAULTS, SEEP SEDIMENTS AND WATER, SOIL BORINGS, GROUND WATER, AND AIR. THE SEEPS AND VAULTS ARE POTENTIAL AREAS OF CONCERN TO THE STREAMS. THERE IS NO SIGNIFICANT EXPOSURE OF TERRESTRIAL OR AQUATIC ORGANISMS TO THE CHEMICALS IN SOIL BORINGS, GROUND WATER, OR THE COLLECTION VAULTS. THE CONCENTRATIONS OF CHEMICALS OF CONCERN IN STREAM WATER, STREAM SEDIMENT AND SURFACE SOIL WERE COMPARED TO BACKGROUND CONCENTRATIONS (FOR METALS), AVAILABLE TOXICITY INFORMATION AND AVAILABLE WATER QUALITY OR SEDIMENT QUALITY CRITERIA.

INDIVIDUAL SEEP WATER CONCENTRATIONS, WERE COMPARED DIRECTLY TO THE CHRONIC WATER QUALITY CRITERIA, ALTHOUGH WATER QUALITY CRITERIA ARE NOT APPLICABLE STANDARDS AT THE SEEPS THEMSELVES. IRON, MANGANESE, AND LEAD WERE REPORTED IN CONCENTRATIONS IN EXCESS OF WATER QUALITY CRITERIA AT MORE THAN ONE SEEP SAMPLING LOCATION (ALTHOUGH LEAD CONCENTRATIONS ALSO EXCEED THE WATER QUALITY CRITERIA AT THREE OF FOUR BACKGROUND STREAM LOCATIONS). HOWEVER, ONLY LEAD CARRIES OVER TO STREAM WATER AS BEING IN EXCESS OF WATER QUALITY CRITERIA. CONCENTRATIONS OF OTHER INORGANIC COMPOUNDS (SILVER AND MERCURY) WHICH EXCEED WATER QUALITY CRITERIA ARE NOT FOUND CONSISTENTLY ACROSS SAMPLING LOCATIONS, OR EVEN AT THE SAME LOCATION BETWEEN DIFFERENT ROUNDS OF SAMPLING, AND NEITHER COMPOUND WAS DETECTED IN STREAM WATER. ALTHOUGH LEACHATE PERIODICALLY ESCAPES FROM THE COLLECTION VAULTS, THE AQUATIC FIELD INVESTIGATION CONFIRMS THAT THERE IS NO IMPACT ON AQUATIC ORGANISMS DOWNGRADIENT FROM THE VAULTS. BASED ON THE RESULTS OF A FISH AND MACROBENTHIC INVERTEBRATE STUDY CONDUCTED AT THE SITE, THE STREAMS APPEAR TO HAVE A HEALTHY POPULATION OF AQUATIC LIFE.

BASED ON THE RESULTS OF THE ANALYSIS OF POTENTIAL IMPACT ON AQUATIC ORGANISMS, IT APPEARS UNLIKELY THAT CONCENTRATIONS OF VARIOUS INORGANIC COMPOUNDS DETECTED IN SEEP AREAS WILL HAVE ADVERSE EFFECTS ON FAUNA. TERRESTRIAL ORGANISMS ARE LIKELY TO BE LESS SENSITIVE TO ENVIRONMENTAL CONCENTRATIONS THAN AQUATIC ORGANISMS AND WILL NOT BE RELYING EXCLUSIVELY ON SEEP AREAS FOR WATER OR NOURISHMENT, FURTHERMORE, THE AQUATIC LIFE CRITERIA ASSUME THAT ORGANISMS LIVE IN WATER, RATHER THAN ONLY OCCASIONALLY BEING EXPOSED TO WATER AS IN THE CASE OF TERRESTRIAL ORGANISMS.

#### CONCLUSION

ACTUAL OR THREATENED RELEASES OF HAZARDOUS SUBSTANCES FROM THE SITE, IF NOT ADDRESSED BY IMPLEMENTING THE RESPONSE ACTION SELECTED IN THE ROD, MAY PRESENT AN IMMINENT AND SUBSTANTIAL ENDANGERMENT TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT.

#DA

#### DESCRIPTION OF ALTERNATIVES

THE SUPERFUND PROCESS REQUIRES THAT THE ALTERNATIVE CHOSEN TO CLEANUP A HAZARDOUS WASTE SITE MEET SEVERAL CRITERIA. THE ALTERNATIVE MUST PROTECT HUMAN HEALTH AND THE ENVIRONMENT, BE COST-EFFECTIVE, AND MEET THE REQUIREMENTS OF ENVIRONMENTAL REGULATIONS. PERMANENT SOLUTIONS TO CONTAMINATION PROBLEMS SHOULD BE DEVELOPED WHENEVER POSSIBLE. THE SOLUTIONS SHOULD REDUCE THE VOLUME, TOXICITY, OR MOBILITY OF THE CONTAMINANTS. EMPHASIS IS ALSO PLACED ON TREATING THE WASTES AT THE SITE, WHENEVER THIS IS POSSIBLE, AND ON APPLYING INNOVATIVE TECHNOLOGIES TO CLEAN UP THE CONTAMINANTS.

THE FS STUDIED A VARIETY OF TECHNOLOGIES TO SEE IF THEY WERE APPLICABLE FOR ADDRESSING THE CONTAMINATION AT THE SITE. THE TECHNOLOGIES DETERMINED TO BE MOST APPLICABLE TO THESE MATERIALS WERE DEVELOPED INTO REMEDIAL ALTERNATIVES. IN ADDITION TO THE ALTERNATIVES PRESENTED IN THE FS, EPA AND PADER HAVE DEVELOPED AN ADDITIONAL ALTERNATIVE (ALTERNATIVE 7) BASED ON INFORMATION PROVIDED IN THE RI AND FS REPORTS. THESE ALTERNATIVES ARE PRESENTED AND DISCUSSED BELOW. ALL COSTS AND IMPLEMENTATION TIMEFRAMES SPECIFIED BELOW ARE ESTIMATES.

COMMON ELEMENTS: ALL OF THE ALTERNATIVES BEING CONSIDERED WOULD INCLUDE COMMON COMPONENTS. EACH ALTERNATIVE WOULD INCLUDE THE FOLLOWING: (1) THE RESTRICTIVE COVENANT WOULD REMAIN IN PLACE AND WOULD CONTINUE TO PROHIBIT ANY FURTHER DEVELOPMENT OF THE PROPERTY FOR RESIDENTIAL, COMMERCIAL, INDUSTRIAL OR OTHER PURPOSES, AND PREVENT THE USE OR DEVELOPMENT OF THE SURFACE WATER OR GROUND WATER ON OR BENEATH THE PROPERTY; (2) THE PUBLIC DRINKING WATER PIPELINE INSTALLED IN 1986 TO SERVICE RESIDENTS WOULD REMAIN IN PLACE FOR ALL THE ALTERNATIVES; (3) A LONG-TERM (30-YEAR) GROUND WATER MONITORING PROGRAM TO MEASURE CONCENTRATIONS OF SITE-RELATED CONTAMINANTS OVER TIME; AND (4) AN EPA REVIEW OF THE SITE EVERY FIVE YEARS TO

ENSURE CONTINUED PROTECTION TO HUMAN HEALTH AND THE ENVIRONMENT FOR EACH OF THE ALTERNATIVES.

ALTERNATIVE 1: NO FURTHER ACTION

CAPITAL COST:	\$0
OPERATION AND MAINTENANCE:	\$25,000
PRESENT WORTH:	\$384,000
MONTHS TO IMPLEMENT:	0

THE NATIONAL CONTINGENCY PLAN (NCP), EPA'S REGULATIONS GOVERNING THE SUPERFUND PROGRAM, REQUIRES THAT THE "NO-ACTION" ALTERNATIVE BE EVALUATED AT EVERY SITE TO ESTABLISH A BASELINE FOR COMPARISON WITH THE OTHER ALTERNATIVES. UNDER THIS ALTERNATIVE, NO REMEDIAL ACTION WOULD BE TAKEN AT THE SITE.

HOWEVER, AT THE OLD CITY OF YORK LANDFILL SITE, REMEDIAL ACTIONS HAVE ALREADY BEEN TAKEN. THUS, A TRUE "NO-ACTION" IS NOT POSSIBLE. THE BEST APPROXIMATION OF A NO-ACTION ALTERNATIVE IS CEASING CURRENT ACTIONS, THAT IS REMOVING THE RESTRICTIVE COVENANT FOR THE SITE AND SHUTTING OFF THE PUBLIC WATER SUPPLY. HOWEVER, SINCE THESE REMEDIAL ACTIONS WILL NOT CEASE, THIS ALTERNATIVE HAS BEEN TERMED "NO FURTHER ACTION". IN THIS ALTERNATIVE, THE PUBLIC WATER LINE WILL REMAIN IN SERVICE AND THE RESTRICTIVE COVENANT WOULD CONTINUE TO PROHIBIT ANY FURTHER DEVELOPMENT OF THE PROPERTY FOR RESIDENTIAL, COMMERCIAL, INDUSTRIAL OR OTHER PURPOSES, AND PREVENT THE USE OR DEVELOPMENT OF THE SURFACE WATER OR GROUND WATER ON OR BENEATH THE PROPERTY. THE SITE WOULD BE LEFT IN ITS CURRENT CONDITION. A LONG-TERM (30-YEAR) GROUND WATER MONITORING PROGRAM WOULD BE IMPLEMENTED AT THE SITE USING THE EXISTING WELLS.

EPA WOULD REVIEW THE SITE EVERY FIVE YEARS IN ACCORDANCE WITH THE REQUIREMENTS OF CERCLA TO ASSURE CONTINUED PROTECTION TO HUMAN HEALTH AND THE ENVIRONMENT.

ALTERNATIVE 2: GROUND WATER RECOVERY AND TREATMENT REFUSE AREA #3 (NORTHEASTERN PORTION), GROUND WATER MONITORING, VAULT SEDIMENT REMOVAL WITH OFF-SITE DISPOSAL

CAPITAL COST:	\$128,100
OPERATION AND MAINTENANCE:	\$154,600
PRESENT WORTH:	\$2,504,700
MONTHS TO IMPLEMENT:	6

THE MAJOR COMPONENTS OF THIS ALTERNATIVE INCLUDE GROUND WATER RECOVERY/TREATMENT IN THE NORTHEASTERN PORTION OF AREA #3 AND ONSITE DISCHARGE OF TREATED GROUND WATER. THE GROUND WATER RECOVERY SYSTEM WILL CONSIST OF THREE PUMPING WELLS WHICH WILL REMOVE THE CONTAMINATED GROUND WATER BY PUMPING IT TO THE SURFACE FOR TREATMENT. THE RECOVERY (EXTRACTION) WELLS WILL BE THE EXISTING EXTRACTION WELLS RW-1 AND RW-2, AND THE BOSER RESIDENTIAL WELL (NOT IN USE). THE EXTRACTION WELLS ARE CONSTRUCTED AND LOCATED SUCH THAT PUMPING THESE WELLS IS EXPECTED TO CREATE A COMBINED CAPTURE ZONE CAPABLE OF PREVENTING FUTURE GROUND WATER MIGRATION TO THE EAST FROM THIS AREA AND TO DRAW BACK CONSTITUENTS ONTO THE SITE THAT HAVE MIGRATED OFFSITE IN THE VICINITY OF THE BOSER RESIDENCE.

THE EXISTING ONSITE AIR STRIPPER WILL BE USED TO TREAT THE RECOVERED GROUND WATER. IN THE AIR STRIPPER, VOLATILE ORGANIC COMPOUNDS (VOCS) TRANSFER FROM THE WATER PHASE INTO THE AIR PHASE. THE TREATED GROUND WATER WILL BE DISCHARGED TO AN ONSITE TRIBUTARY IN ACCORDANCE WITH NPDES REQUIREMENTS. THE AIR STRIPPER WILL COMPLY WITH THE CLEAN AIR ACT AND THE REQUIREMENTS PROMULGATED UNDER THE PENNSYLVANIA POLLUTION CONTROL ACT AT 25 PA. CODE CHAPTER 127 FOR EMISSIONS FROM THE AIR STRIPPER.

IN ADDITION TO THE GROUND WATER RECOVERY AND TREATMENT, THIS ALTERNATIVE WILL ALSO INCLUDE THE PERIODIC REMOVAL OF ACCUMULATED SEDIMENT IN THE CONCRETE VAULTS NEAR THE WEST SEEP. THE SEDIMENT WOULD BE REMOVED BY PUMPING OUT THE SEDIMENT FROM THE VAULTS WITH A STANDARD VACUUM PUMP TRUCK INTO 5,000-GALLON TANK TRUCKS FOR OFFSITE DISPOSAL AT A PERMITTED TREATMENT/DISPOSAL FACILITY. SUBSEQUENT REMOVAL/DISPOSAL OF SEDIMENT WOULD BE CONDUCTED WHEN THE VAULT TANKS REACHED APPROXIMATELY THREE-QUARTERS FULL.

ALTERNATIVE 3: GROUND WATER RECOVERY AND TREATMENT REFUSE AREA #3 (NORTHEASTERN PORTION), RESTORE SOIL COVER AT REFUSE AREA #3 (NORTHEASTERN PORTION), GROUND WATER MONITORING, VAULT SEDIMENT REMOVAL WITH OFF-SITE DISPOSAL

CAPITAL COST:	\$2,737,400
OPERATION AND MAINTENANCE:	\$180,900
PRESENT WORTH:	\$5,214,200
MONTHS TO IMPLEMENT:	12

THIS ALTERNATIVE CONSISTS OF THE SAME REMEDIAL ACTIONS AS ALTERNATIVE 2 PLUS RESTORING THE LANDFILL COVER IN THE NORTHEASTERN PORTION OF AREA #3 WHICH ENCOMPASSES APPROXIMATELY SIXTEEN ACRES. THIS RESTORATION WOULD INVOLVE BRINGING ALL REFUSE AREAS CONTAINING LESS THAN TWO FEET OF COVER UP TO A MINIMUM OF TWO FEET.

RESTORATION OF THE EXISTING COVER AT THE NORTHEASTERN PORTION OF AREA #3 WOULD INCLUDE THE FOLLOWING ELEMENTS: (1) CONTROLLING SURFACE RUN-ON BY INSTALLING A DIVERSION SWALE ALONG SOUTH ROAD BY THE BOSER RESIDENCE; (2) APPLYING A UNIFORM SOIL COVER OVER THE NORTHEASTERN PORTION OF AREA #3 WHICH WILL BRING THE TOTAL SOIL COVER UP TO TWO FEET; (3) HYDROSEEDING THE NEWLY COVERED PORTIONS ALONG WITH ANY REQUIRED EROSION MATTING; AND (4) CONDUCTING COVER INSPECTION AND MAINTENANCE.

THIS ALTERNATIVE WOULD INCORPORATE GAS PIPE VENTS TO INTERCEPT AND VENT MIGRATING LANDFILL GAS (E.G. METHANE). MONITORING PROBES WOULD BE INSTALLED OUTSIDE THE PERIMETER OF THE RESTORED COVER FOR MONITORING THE EFFECTIVENESS OF THE GAS CONTROL SYSTEM. GAS MONITORING WOULD BE CONDUCTED TO ENSURE THE EFFECTIVENESS OF THE VENTING SYSTEM.

ALTERNATIVE 4: MULTI-LAYER CAP OVER AREA #1, GROUND WATER RECOVERY AND TREATMENT AT REFUSE AREA #3 (NORTHEASTERN PORTION), GROUND WATER MONITORING, VAULT SEDIMENT REMOVAL WITH OFF-SITE DISPOSAL

CAPITAL COST:	\$2,433,300
OPERATION AND MAINTENANCE:	\$205,800
PRESENT WORTH:	\$5,597,000
MONTHS TO IMPLEMENT:	12

THIS ALTERNATIVE INCORPORATES ALL THE REMEDIAL ACTIONS DESCRIBED UNDER ALTERNATIVE 2 IN ADDITION TO ESTABLISHING A MULTILAYER CAP OVER REFUSE AREA #1. THE CAP DESIGN WOULD BE IN CONFORMANCE WITH CURRENT PENNSYLVANIA PERFORMANCE STANDARDS FOR MUNICIPAL LANDFILLS AS DESCRIBED IN 25 PA. CODE CHAPTER 273. THE PURPOSE OF THE CAP WOULD BE TO REDUCE INFILTRATION OF PRECIPITATION, WHICH WILL ULTIMATELY REDUCE THE AMOUNT OF LEACHATE PRODUCED FROM THE LANDFILLED AREA, THEREBY REDUCING THE CONCENTRATION OF LEACHATE CONSTITUENTS IN THE GROUND WATER.

THE CAP ALTERNATIVE WOULD INCORPORATE GAS PIPE VENTS TO INTERCEPT AND VENT MIGRATING LANDFILL GAS (E.G. METHANE). MONITORING PROBES WOULD BE INSTALLED OUTSIDE THE PERIMETER OF THE CAP FOR MONITORING THE EFFECTIVENESS OF THE GAS CONTROL SYSTEM. GAS MONITORING WOULD BE CONDUCTED TO ENSURE THE EFFECTIVENESS OF THE VENTING SYSTEM.

ALTERNATIVE 5: MULTI-LAYER CAP OVER AREA #3 (NORTHEASTERN PORTION), GROUND WATER MONITORING, VAULT SEDIMENT REMOVAL WITH OFF-SITE DISPOSAL

CAPITAL COST:	\$5,506,200
OPERATION AND MAINTENANCE:	\$120,300
PRESENT WORTH:	\$7,355,600
MONTHS TO IMPLEMENT:	12

THIS ALTERNATIVE INCORPORATES A PARTIAL MULTILAYER CAP OVER THE NORTHEASTERN PORTION OF AREA #3 ENCOMPASSING APPROXIMATELY 16 ACRES IN THE VICINITY OF THE BOSER RESIDENCE. THE CAP DESIGN WOULD BE IN ACCORDANCE WITH CURRENT PENNSYLVANIA PERFORMANCE STANDARDS FOR MUNICIPAL LANDFILLS DESCRIBED IN 25 PA. CODE CHAPTER 273. THE PURPOSE OF THE CAP WOULD BE TO REDUCE INFILTRATION OF PRECIPITATION, WHICH WILL ULTIMATELY REDUCE THE AMOUNT OF LEACHATE PRODUCED FROM THE LANDFILLED AREA, THEREBY REDUCING THE CONCENTRATION OF LEACHATE CONSTITUENTS IN THE GROUND WATER.

THE CAP ALTERNATIVE WOULD INCORPORATE GAS PIPE VENTS TO INTERCEPT AND VENT MIGRATING LANDFILL GAS (E.G. METHANE). MONITORING PROBES WOULD BE INSTALLED OUTSIDE THE PERIMETER OF THE CAP FOR MONITORING THE EFFECTIVENESS OF THE GAS CONTROL SYSTEM. GAS MONITORING WOULD BE CONDUCTED TO ENSURE THE EFFECTIVENESS OF THE VENTING SYSTEM.

THIS ALTERNATIVE WOULD ALSO INCLUDE THE REMOVAL OF THE ACCUMULATED SEDIMENTS IN THE WEST SEEP VAULTS AS DESCRIBED IN ALTERNATIVE 2.

ALTERNATIVE 6: MULTI-LAYER CAP OVER REFUSE AREA #3 (ENTIRE AREA), GROUND WATER MONITORING, VAULT SEDIMENT REMOVAL WITH OFF-SITE DISPOSAL

CAPITAL COST:	\$17,534,400
OPERATION AND MAINTENANCE:	\$207,200
PRESENT WORTH:	\$20,719,600
MONTHS TO IMPLEMENT:	24

THIS ALTERNATIVE IS SIMILAR TO ALTERNATIVE 5 EXCEPT THAT INSTEAD OF JUST THE 16-ACRE NORTHEASTERN PORTION OF THE SITE BEING CAPPED, THE ENTIRE AREA COMPRISING REFUSE AREA #3 WOULD BE COVERED WITH A MULTILAYER CAP CONSTRUCTED IN ACCORDANCE WITH 25 PA. CODE CHAPTER 273. REFUSE AREA #3 ENCOMPASSES APPROXIMATELY 50 ACRES. APPROXIMATELY ONE ACRE OF AREA #3 IN THE VICINITY OF THE EAST SEEP, WHERE THE EXISTING SLOPE IS ON THE ORDER OF 40 PERCENT, WOULD REQUIRE REGRADING/FILLING OF THE SLOPE TO REDUCE THE SEVERITY OF THIS SLOPE TO A MAXIMUM

OF 33 PERCENT WITH TERRACING TO FACILITATE CONSTRUCTION.

ALTERNATIVE 7: MULTILAYER CAP OVER REFUSE AREA #3 (ENTIRE AREA) AND AREA #1, GROUND WATER RECOVERY/TREATMENT IN AREA #3 AND AREA #1, GROUND WATER MONITORING, VAULT SEDIMENT REMOVAL AND OFFSITE DISPOSAL

CAPITAL COST:	\$21,000,000
OPERATION AND MAINTENANCE:	\$300,000
PRESENT WORTH:	\$26,000,000
MONTHS TO IMPLEMENT:	24

THIS ALTERNATIVE INCORPORATES THE CONSTRUCTION OF A MULTILAYER CAP OVER REFUSE AREA #1 (APPROXIMATELY 5.5 ACRES) AND #3 (APPROXIMATELY 50 ACRES). THE CAP DESIGN WOULD BE IN ACCORDANCE WITH THE PENNSYLVANIA PERFORMANCE STANDARDS FOR MUNICIPAL LANDFILLS SET FORTH AT 25 PA. CODE CHAPTER 273. THE CONSTRUCTION OF THE MULTILAYER CAP WILL EFFECTIVELY REDUCE THE INFILTRATION OF PRECIPITATION TO THE LANDFILLED AREAS OF AREA #1 AND #3, THEREBY REDUCING THE CONCENTRATION OF LEACHATE CONSTITUENTS IN THE GROUND WATER. A FENCE WOULD BE CONSTRUCTED AROUND THE CAPPED AREAS TO RESTRICT ACCESS AND PROTECT THE INTEGRITY OF THE CAP.

THE CAP ALTERNATIVE WOULD INCORPORATE GAS PIPE VENTS TO INTERCEPT AND VENT MIGRATING LANDFILL GAS (E.G. METHANE). MONITORING PROBES WOULD BE INSTALLED OUTSIDE THE PERIMETER OF THE CAP FOR MONITORING THE EFFECTIVENESS OF THE GAS CONTROL SYSTEM. GAS MONITORING WOULD BE CONDUCTED TO ENSURE THE EFFECTIVENESS OF THE VENTING SYSTEM.

A GROUND WATER RECOVERY/TREATMENT SYSTEM WILL BE EMPLOYED AT BOTH AREAS #1 AND #3. RECOVERY (EXTRACTION) WELLS WILL BE LOCATED SUCH THAT PUMPING THESE WELLS WOULD CREATE A COMBINED CAPTURE ZONE CAPABLE OF PREVENTING FURTHER MIGRATION OF CONTAMINATED GROUND WATER AND TREATMENT OF GROUND WATER THAT IS CURRENTLY CONTAMINATED. THE EXACT NUMBER OF WELLS WOULD BE DETERMINED DURING THE REMEDIAL DESIGN. AIR STRIPPING WILL BE USED TO TREAT THE RECOVERED GROUND WATER. TO THE EXTENT FEASIBLE, SUCH RECOVERY WELLS WILL BE INCORPORATED INTO THE EXISTING GROUND WATER RECOVERY/TREATMENT SYSTEM.

IN ADDITION TO THE GROUND WATER RECOVERY AND TREATMENT, THIS ALTERNATIVE WOULD ALSO INCLUDE THE REMOVAL OF THE ACCUMULATED SEDIMENTS IN THE WEST SEEP VAULTS AS DESCRIBED IN ALTERNATIVE 2.

#SCAA

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

A DETAILED ANALYSIS WAS PERFORMED ON THE SEVEN ALTERNATIVES USING THE NINE EVALUATION CRITERIA SPECIFIED IN THE NCP IN ORDER TO SELECT A REMEDY. THE FOLLOWING IS A SUMMARY OF THE COMPARISON OF EACH ALTERNATIVES' STRENGTH AND WEAKNESSES WITH RESPECT TO THE NINE EVALUATION CRITERIA. THESE NINE EVALUATION CRITERIA ARE LISTED IN EXHIBIT A.

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

ALL THE ALTERNATIVES WOULD PROVIDE VARYING DEGREES OF PROTECTION TO HUMAN HEALTH AND THE ENVIRONMENT BY ELIMINATING, REDUCING, OR CONTROLLING RISK THROUGH TREATMENT, ENGINEERING CONTROLS, OR INSTITUTIONAL CONTROLS. ALTERNATIVES 2, 3, 4, AND 7 WOULD REDUCE THE RISK TO HUMAN HEALTH FROM EXPOSURE TO CONTAMINATED GROUND WATER THROUGH GROUND WATER RECOVERY AND TREATMENT. ALTERNATIVE 7 WOULD BE THE MOST PROTECTIVE OF THESE ALTERNATIVES SINCE IT ADDRESSES CONTAMINATED GROUND WATER IN BOTH AREAS #1 AND #3 THROUGH GROUND WATER RECOVERY/TREATMENT. ALTERNATIVE 5 PROVIDES FOR PLACING A MULTILAYER CAP ON THE NORTHEASTERN SECTION OF AREA #3, AND ALTERNATIVE 6 PROVIDES FOR PLACING A MULTILAYER CAP OVER THE ENTIRE AREA OF AREA #3. ALTHOUGH BOTH ALTERNATIVES 5 AND 6 WOULD RESULT IN SOME REDUCTION IN GROUND WATER CONTAMINATION IN AREA #3, NEITHER INCLUDES GROUND WATER RECOVERY/TREATMENT WHICH WOULD PREVENT FURTHER MIGRATION OF CONTAMINATED GROUND WATER IN AREA #3 NOR DOES EITHER ALTERNATIVE ADDRESS GROUND WATER CONTAMINATION IN AREA #1. ALTERNATIVE 1 (NO FURTHER ACTION) WOULD BE LEAST PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT SINCE THIS ALTERNATIVE DOES NOT ACTIVELY ADDRESS REDUCING OR CONTROLLING CONTAMINATION AT THE SITE.

ALL THE ALTERNATIVES (EXCLUDING THE NO FURTHER ACTION ALTERNATIVE) PROVIDE FOR THE REMOVAL OF ACCUMULATED SEDIMENTS IN THE COLLECTION VAULTS AT THE WEST SEEP WHICH WOULD ELIMINATE POTENTIAL AQUATIC LIFE IMPACTS TO THE SOUTHERN TRIBUTARY ONSITE.

COMPLIANCE WITH ARARS

THE FOLLOWING APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) HAVE BEEN CURRENTLY IDENTIFIED: CLEAN AIR ACT, PENNSYLVANIA AIR POLLUTION CONTROL ACT, CLEAN WATER ACT, PENNSYLVANIA CLEAN STREAMS LAW, PENNSYLVANIA SOLID WASTE MANAGEMENT ACT, PENNSYLVANIA MUNICIPAL WASTE MANAGEMENT REGULATIONS, RESOURCE CONSERVATION AND RECOVERY ACT, AND THE PENNSYLVANIA HAZARDOUS WASTE MANAGEMENT REGULATIONS.

THE NO FURTHER ACTION ALTERNATIVE WOULD NOT MEET ARARS. THE GROUND WATER RECOVERY/TREATMENT SYSTEM FOR ALTERNATIVES 2, 3, 4, AND 7 WOULD COMPLY WITH THE CLEAN AIR ACT AND REQUIREMENTS PROMULGATED UNDER THE PENNSYLVANIA AIR POLLUTION CONTROL ACT AT 25 PA. CODE CHAPTER 127 FOR EMISSIONS FROM THE TREATMENT SYSTEM. THE LANDFILL GAS VENTING SYSTEMS UNDER ALTERNATIVES 4 THROUGH 7 WOULD HAVE TO MEET THE REQUIREMENTS UNDER 25 PA. CODE CHAPTER 127, AND SPECIFICALLY SECTION 127.12(A)(5) FOR NEW AIR EMISSION SOURCES.

ALL DISCHARGES OF TREATED PROCESS WATER TO ONSITE TRIBUTARIES FROM THE GROUND WATER TREATMENT SYSTEM WOULD MEET NPDES REQUIREMENTS DEVELOPED PURSUANT TO THE CLEAN WATER ACT AND THE PENNSYLVANIA CLEAN STREAMS LAW. THE PENNSYLVANIA WATER QUALITY CRITERIA PROMULGATED AT 25 PA CODE CHAPTER 93.1-93.9 AND 93.16 ARE ARARS FOR THE TRIBUTARIES ONSITE. HOWEVER, EPA HAS DETERMINED THAT THESE CRITERIA ARE NOT DIRECTLY APPLICABLE TO THE LEACHATE SEEPS BECAUSE NO AQUATIC LIFE EXISTS IN THE SEEPS.

THE PENNSYLVANIA MUNICIPAL WASTE MANAGEMENT REGULATIONS PROMULGATED AT 25 PA. CODE CHAPTER 273 ARE NOT LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE FOR THE LANDFILL CLOSURE REQUIREMENTS BECAUSE THE LANDFILL WAS CLOSED IN JANUARY 1975. HOWEVER, THE REGULATION WOULD BE BOTH RELEVANT AND APPROPRIATE FOR DESIGN AND CONSTRUCTION OF THE MULTILAYER CAP UNDER ALTERNATIVES 4, 5, 6, AND 7.

THE PENNSYLVANIA ARAR FOR THE REMEDIATION OF GROUND WATER WHICH CONTAINS HAZARDOUS SUBSTANCES IS THAT ALL GROUND WATER SHALL BE REMEDIATED TO "BACKGROUND" QUALITY. THE CLEAN UP LEVELS FOR THESE ALTERNATIVES IS REMEDIATION TO BACKGROUND LEVELS FOR GROUND WATER. IF IMPLEMENTATION OF THE SELECTED REMEDY DEMONSTRATES, IN CORROBORATION WITH HYDROGEOLOGICAL AND CHEMICAL EVIDENCE, THAT IT WILL BE TECHNICALLY IMPRACTICABLE TO ACHIEVE AND MAINTAIN THE REMEDIATION LEVELS THROUGHOUT THE AREA OF ATTAINMENT, THE EPA IN CONSULTATION WITH THE COMMONWEALTH OF PENNSYLVANIA, WILL CONSIDER AMENDING THE ROD OR ISSUING AN EXPLANATION OF SIGNIFICANT DIFFERENCES (ESD) TO INFORM THE PUBLIC OF ALTERNATIVE GROUND WATER CLEAN UP LEVELS.

DISPOSAL OF THE RECOVERED SEDIMENTS FROM THE COLLECTION VAULTS AT THE WEST SEEP WOULD BE CONDUCTED IN ACCORDANCE WITH THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AND THE PENNSYLVANIA HAZARDOUS WASTE MANAGEMENT REGULATIONS, AS REQUIRED.

#### LONG-TERM EFFECTIVENESS AND PERMANENCE

EACH OF THE ALTERNATIVES CONSIDERED ADDRESSES THE GROUND WATER CONTAMINATION AT THE SITE AND THE ACCUMULATION OF CONTAMINATED SEDIMENTS IN THE CONCRETE COLLECTION VAULTS AT THE WEST SEEP. BY ELIMINATING CONTAMINANTS PRESENT IN THE GROUND WATER AND THE ACCUMULATION OF SEDIMENTS IN THE COLLECTION VAULTS, EACH OF THE ALTERNATIVES ACHIEVES A CERTAIN DEGREE OF LONG-TERM EFFECTIVENESS AND PERMANENCE. THE DIFFERENCE BETWEEN THE ALTERNATIVES WITH REGARD TO THE LONG-TERM EFFECTIVENESS AND PERMANENCE IS DIRECTLY RELATED TO HOW EACH ALTERNATIVE ADDRESSES GROUND WATER CONTAMINATION AT THE SITE.

THE GROUND WATER RECOVERY/TREATMENT SYSTEM OF ALTERNATIVE 7 PROVIDES THE GREATEST DEGREE OF LONG-TERM EFFECTIVENESS AND PERMANENCE. FOR THIS ALTERNATIVE, THE IMPLEMENTATION OF A GROUND WATER RECOVERY/ TREATMENT SYSTEM IN BOTH AREAS #1 AND #3 WOULD PROVIDE FOR A GREATER REDUCTION IN GROUND WATER CONTAMINANT CONCENTRATION THAN ALTERNATIVES 2, 3, AND 4 SINCE THESE ALTERNATIVES ADDRESS GROUND WATER RECOVERY/ TREATMENT IN THE NORTHEASTERN PORTION OF AREA #3 ONLY. ALTERNATIVES 4, 5, 6, AND 7 INCLUDE CONSTRUCTING A MULTILAYER IMPERMEABLE CAP OVER SELECTED AREAS OF THE SITE. A CAP WOULD EFFECTIVELY REDUCE THE INFILTRATION OF PRECIPITATION THROUGH THE REFUSE THEREBY DECREASING THE AMOUNT OF CONTAMINANT LEACHING INTO THE GROUND WATER. ALTERNATIVES 2 AND 3 DO NOT INCLUDE CONSTRUCTION OF A IMPERMEABLE CAP OVER ANY OF THE REFUSE AREAS. AN ADVANTAGE OF NOT PLACING AN IMPERMEABLE CAP OVER LANDFILLED AREAS IS THAT IT WOULD ALLOW THE CONTINUOUS FLUSHING OF AREAS #1 AND #3 THROUGH THE INFILTRATION OF PRECIPITATION INTO THESE AREAS. THE CONTINUOUS FLUSHING ACTION WOULD PERMIT THE ONGOING DEGRADATION OF CONSTITUENTS IN THE REFUSE AND WOULD EVENTUALLY REDUCE THE MASS OF THE CONTAMINANTS IN AREAS #1 AND #3.

THE MULTILAYER CAPPING OPTIONS OF ALTERNATIVES 5 AND 6 DO NOT INCLUDE GROUND WATER RECOVERY/TREATMENT NOR DO THEY ADDRESS GROUND WATER CONTAMINATION IN AREA #1.

#### REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT

THE VOLUME OF CONTAMINANTS IN THE GROUND WATER WILL BE IRREVERSIBLY REDUCED BY GROUND WATER RECOVERY AND TREATMENT UNDER ALTERNATIVES 2, 3, 4, AND 7. RECOVERY AND TREATMENT OF THE GROUND WATER WOULD PERMANENTLY REMOVE CONSTITUENTS FROM THE AQUIFER, AND TREATMENT OF THE GROUND WATER WILL MAKE THE REMAINING GROUND WATER LESS TOXIC. THE HYDRAULIC BARRIER CREATED BY THE PUMPING WILL CONTAIN THE CONSTITUENTS THEREBY REDUCING THE MOBILITY OF THE CONSTITUENTS IN THE GROUND WATER. FOR ALTERNATIVE 7, HOWEVER, THE REDUCTION IN CONTAMINANT VOLUME, TOXICITY, AND MOBILITY IN THE GROUND WATER WILL BE GREATER SINCE THE RECOVERY/TREATMENT SYSTEM WILL ENCOMPASS BOTH AREAS #1 AND #3.

ALL THE ALTERNATIVES (EXCLUDING NO FURTHER ACTION) WOULD PROVIDE FOR THE REDUCTION IN MOBILITY OF THE ACCUMULATED SEDIMENTS IN THE COLLECTION VAULTS BY REMOVING THESE SEDIMENTS. THE TOXICITY AND VOLUME OF THE CONTAMINANTS WOULD BE REDUCED AT THE OFFSITE DISPOSAL/TREATMENT FACILITY.

## SHORT-TERM EFFECTIVENESS

ALTERNATIVES 3, 4, 5, 6, AND 7 WOULD PRESENT SHORT-TERM RISKS TO WORKERS AND THE COMMUNITY DUE TO INCREASED TRUCK AND CONSTRUCTION TRAFFIC DURING THE INSTALLATION OF THE ADDITIONAL SOIL COVER OR CONSTRUCTION OF A MULTILAYER CAP. FUGITIVE DUST EMISSIONS FROM THE SITE MAY OCCUR DURING CONSTRUCTION ACTIVITIES. RISKS TO ONSITE WORKERS COULD BE MINIMIZED BY THE USE OF PROPER OPERATING PROCEDURES AND PERSONAL PROTECTIVE GEAR. PRECAUTIONS WOULD BE TAKEN TO ENSURE THAT THESE EMISSIONS WOULD NOT IMPACT THE COMMUNITY.

ALTERNATIVES 2, 3, 4, AND 7 WOULD ALSO PRESENT SHORT-TERM RISKS TO WORKERS WHO MIGHT COME IN CONTACT WITH CONTAMINATED GROUND WATER RESULTING FROM MAINTENANCE ACTIVITIES ON THE GROUND WATER TREATMENT SYSTEM, RECOVERY WELLS, OR ASSOCIATED PIPING. THE HEALTH RISKS ASSOCIATED WITH SUCH SHORT-TERM EXPOSURES IS CONSIDERED MINIMAL. RISKS TO ONSITE WORKERS COULD BE MINIMIZED BY THE USE OF PROPER MONITORING, OPERATING PROCEDURES AND PERSONAL PROTECTIVE GEAR.

OTHER SHORT-TERM RISKS TO ONSITE WORKERS MIGHT OCCUR DURING THE REMOVAL OF THE VAULT SEDIMENT. SUCH RISKS ARE PHYSICAL IN NATURE, SUCH AS POSSIBLE FALLS AND POTENTIAL ACCIDENTS INVOLVED WITH EQUIPMENT.

## IMPLEMENTABILITY

EACH OF THE ALTERNATIVES UNDER CONSIDERATION WOULD BE IMPLEMENTABLE AT THE SITE USING CONVENTIONAL CONSTRUCTION PRACTICES. ALTERNATIVES 5, 6, AND 7 MAY POSE SOME IMPLEMENTATION PROBLEMS DURING CONSTRUCTION OF THE MULTILAYER CAP DUE TO THE PROXIMITY OF THE BOSER RESIDENCE TO AREA #3.

## COST

THE LOWEST COST ALTERNATIVE (EXCLUDING THE NO FURTHER ACTION ALTERNATIVE) IS ALTERNATIVE 2 AT \$2,504,700. THE HIGHEST COST ALTERNATIVE IS ALTERNATIVE 7 AT APPROXIMATELY \$26,000,000. THE COST OF THE OTHER ALTERNATIVES CONSIDERED ARE PROVIDED IN THE SUMMARY OF ALTERNATIVES SECTION OF THE ROD.

## STATE ACCEPTANCE

THE COMMONWEALTH OF PENNSYLVANIA DOES NOT CONCUR WITH THE SELECTED REMEDY.

## COMMUNITY ACCEPTANCE

COMMUNITY ACCEPTANCE IS ASSESSED IN THE ATTACHED RESPONSIVENESS SUMMARY. THE RESPONSIVENESS SUMMARY PROVIDES A THOROUGH REVIEW OF THE PUBLIC COMMENTS RECEIVED ON THE RI/FS AND THE PROPOSED PLAN, AND EPA'S RESPONSES TO COMMENTS RECEIVED.

## #SR

## SELECTED REMEDY

BASED UPON CONSIDERATION OF INFORMATION AVAILABLE FOR THE OLD CITY OF YORK LANDFILL SITE, INCLUDING THE DOCUMENTS AVAILABLE IN THE ADMINISTRATIVE RECORD FILE, AN EVALUATION OF THE RISKS CURRENTLY POSED BY THE SITE, THE REQUIREMENTS OF CERCLA, THE DETAILED ANALYSIS OF THE ALTERNATIVES, AND PUBLIC COMMENTS, EPA HAS SELECTED A MODIFIED COMBINATION OF ALTERNATIVE 3 AND ALTERNATIVE 7 AS THE REMEDY TO BE IMPLEMENTED AT THE OLD CITY OF YORK LANDFILL SITE.

THE SELECTED REMEDY SHALL INCLUDE THE FOLLOWING: (1) THE RESTORATION OF THE SOIL COVER (SEE FIGURE 6) IN THE NORTHEASTERN PORTION OF REFUSE AREA #3 TO A TWO FOOT MINIMUM; (2) INSTALLATION OF A DIVERSION SWALE ALONG SOUTH ROAD IN THE VICINITY OF THE BOSER RESIDENCE; (3) REVEGETATION OF THE SOIL COVER; (4) A GROUND WATER RECOVERY/TREATMENT SYSTEM IN BOTH AREAS #1 AND #3 INCLUDING 30-YEAR GROUND WATER MONITORING; (5) A LANDFILL GAS VENTING SYSTEM IN THE VICINITY OF THE BOSER RESIDENCE AND INSTALLATION OF GAS MONITORING PROBES IN THE NORTHEASTERN PORTION OF REFUSE AREA #3; AND (6) VAULT SEDIMENT REMOVAL WITH OFFSITE DISPOSAL AT AN EPA AND PADER APPROVED FACILITY. IN ADDITION, THE SELECTED REMEDY WOULD INCLUDE A PERIMETER FENCE AT THE LEACHATE COLLECTION VAULTS TO PREVENT PUBLIC ACCESS, AND A SURFACE WATER/SEDIMENT MONITORING PROGRAM FOR THE LEACHATE SEEPS AND TRIBUTARIES ONSITE TO ENSURE CONTINUED PROTECTION TO HUMAN HEALTH AND THE ENVIRONMENT.

IT IS ESTIMATED THAT THE PRESENT WORTH COST OF THE SELECTED REMEDY WILL BE APPROXIMATELY \$8,000,000. IN ESTIMATING THE COST OF THE SELECTED REMEDY, EPA USED THE PRESENT WORTH COST OF ALTERNATIVE 3 AND THE PRESENT WORTH COST OF A SIMILAR GROUND WATER RECOVERY/TREATMENT PROJECT AT A SIMILAR SUPERFUND SITE AS A BASIS IN ESTIMATING THE PRESENT WORTH COST OF THE SELECTED REMEDY (SEE TABLE 28 FOR A DETAILED CAPITAL COST SUMMARY).

REMEDIATION OF THE LOW LEVEL THREATS AT THE OLD CITY OF YORK LANDFILL SITE WILL EFFECTIVELY ELIMINATE THE RISKS ASSOCIATED WITH POTENTIAL EXPOSURE TO CONTAMINATED GROUND WATER AT THE SITE.

## PERFORMANCE STANDARDS

(1) RESTORATION OF THE SOIL COVER

A UNIFORM AND COMPACTED LAYER OF SOIL SHALL BE PLACED OVER THE NORTHEASTERN SECTION OF REFUSE AREA #3 TO RESTORE THE SOIL COVER IN THIS AREA TO A TWO FOOT MINIMUM. THIS SOIL COVER SHALL (1) PROVIDE DERMAL PROTECTION FROM THE REFUSE IN THE NORTHEASTERN PORTION OF AREA #3; (2) BE CAPABLE OF SUPPORTING THE GERMINATION OF PROPAGATION OF VEGETATIVE COVER; AND (3) COMPACT WELL AND NOT CRACK EXCESSIVELY WHEN DRY. THE COVER SHALL BE MAINTAINED FOR 30 YEARS.

(2) INSTALLATION OF A DIVERSION SWALE ALONG SOUTH ROAD

A DIVERSION SWALE TO CONTROL SURFACE WATER RUN-ON AND RUN-OFF SHALL BE CONSTRUCTED ALONG SOUTH ROAD BY THE BOSER RESIDENCE TO PREVENT EROSION OF THE SOIL COVER. THE MANAGEMENT OF SURFACE WATER AND CONTROL OF SOIL EROSION SHALL BE BASED ON THE 24-HOUR PRECIPITATION EVENT IN INCHES TO BE EXPECTED ONCE IN 25 YEARS.

(3) REVEGETATION OF THE RESTORED SOIL COVER

VEGETATION SHALL BE ESTABLISHED ON THE RESTORED SOIL COVER IN THE NORTHEASTERN PORTION OF AREA #3. REVEGETATION SHALL PROVIDE FOR AN EFFECTIVE AND PERMANENT VEGETATIVE COVER OF THE SAME SEASONAL VARIETY AS VEGETATION NATIVE TO THE SITE AND CAPABLE OF SELF REGENERATION AND PLANT SUCCESSION. REVEGETATION SHALL PROVIDE A QUICK GERMINATING, FAST-GROWING VEGETATIVE COVER CAPABLE OF STABILIZING THE SOIL SURFACE FROM EROSION. MULCH SHALL BE APPLIED TO REGRADED AREAS WHERE NECESSARY TO CONTROL EROSION, PROMOTE GERMINATION OF SEEDS AND INCREASE THE MOISTURE RETENTION OF SOIL.

(4) GROUND WATER RECOVERY/TREATMENT SYSTEM AND GROUND WATER MONITORING

GROUND WATER RECOVERY/TREATMENT SHALL BE CONDUCTED IN BOTH REFUSE AREAS #1 AND #3. THE RECOVERY WELLS SHALL BE LOCATED WITHIN THE CONTAMINATED PLUMES EMANATING FROM BOTH REFUSE AREAS #1 AND #3. THE FINAL NUMBER AND LOCATION OF RECOVERY WELLS FOR BOTH AREA #1 AND #3 SHALL BE DETERMINED BY EPA DURING THE DESIGN PHASE OF THE PROJECT. THE EXISTING AIR STRIPPER ONSITE SHALL BE USED TO TREAT THE RECOVERED GROUND WATER. IF NEEDED, AN ADDITIONAL AIR STRIPPER AND/OR RECOVERY WELLS OR MONITORING WELLS SHALL BE INSTALLED AS PART OF THE REMEDIAL ACTION TO ENSURE COMPLIANCE WITH THE CLEAN UP LEVELS OF THE SELECTED REMEDY.

THE GROUND WATER EXTRACTION SYSTEM WILL CONTINUE TO OPERATE UNTIL THE REMEDIATION TO CLEAN UP LEVELS OF CONTAMINANTS IS REACHED THROUGHOUT THE AREA OF ATTAINMENT. THE AREA OF ATTAINMENT SHALL ENCOMPASS THE AREA OUTSIDE THE BOUNDARY OF AREAS #1 AND #3 AND UP TO THE BOUNDARY OF THE CONTAMINANT PLUMES. THE CLEAN UP LEVEL FOR THE AQUIFER CONTAMINANTS ARE, FOR EACH CONTAMINANT, THE LOWER OF (1) THE STANDARDS LISTED IN TABLE 29 AND (2) THE BACKGROUND LEVEL OF THE CONTAMINANT. BACKGROUND LEVELS FOR EACH OF THE CONTAMINANTS LISTED IN TABLE 29 SHALL BE THE METHOD DETECTION LIMIT FOR THE METHOD OF ANALYSIS UTILIZED WITH RESPECT TO THAT CONTAMINANT. THE APPROPRIATE METHODS OF ANALYSIS ARE 40 CFR PART 136 (SERIES 601 AND 602), AND 40 CFR PART 141 (SERIES 524.2). TO THIS END, MONITORING WELLS SHALL BE SAMPLED ON A QUARTERLY BASIS FOR AT LEAST 30-YEARS. THE NUMBER AND LOCATION OF THESE MONITORING WELLS WILL BE SPECIFIED DURING THE REMEDIAL DESIGN, AND ADDITIONAL MONITORING WELLS SHALL BE INSTALLED, IF REQUIRED. IF SAMPLING CONFIRMS THAT BACKGROUND LEVELS HAVE BEEN ATTAINED THROUGHOUT THE AREA OF ATTAINMENT AND REMAIN AT THE REQUIRED LEVELS FOR TWELVE CONSECUTIVE QUARTERS, OPERATION OF THE EXTRACTION SYSTEM CAN BE SUSPENDED. IF, SUBSEQUENT TO THE EXTRACTION SYSTEM SHUTDOWN, QUARTERLY MONITORING SHOWS THE GROUND WATER CONCENTRATIONS OF ANY CONTAMINANT OF CONCERN TO BE ABOVE THE LEVELS SPECIFIED IN TABLE 29, THE EXTRACTION SYSTEM SHALL BE RESTARTED AND CONTINUED UNTIL THE LEVELS IN TABLE 29 HAVE ONCE MORE BEEN ATTAINED FOR TWELVE CONSECUTIVE QUARTERS.

ALL EXTRACTED GROUND WATER SHALL BE TREATED TO LEVELS WHICH WILL ALLOW FOR DISCHARGE INTO TRIBUTARY D IN COMPLIANCE WITH THE REQUIREMENTS OF FEDERAL AND STATE DISCHARGE REGULATIONS. ALL EMISSIONS FROM THE AIR STRIPPER SHALL BE IN COMPLIANCE WITH THE CLEAN AIR ACT AND THE REQUIREMENTS OF THE PENNSYLVANIA AIR POLLUTION CONTROL ACT PROMULGATED AT 25 PA. CODE CHAPTER 127.

IT IS ESTIMATED THAT IT WILL TAKE IN EXCESS OF THIRTY YEARS TO ACHIEVE THE GROUND WATER REMEDIATION LEVELS AS SPECIFIED IN THIS ROD. IF IMPLEMENTATION OF THE SELECTED REMEDY DEMONSTRATES, IN CORROBORATION WITH HYDROGEOLOGICAL AND CHEMICAL EVIDENCE, THAT IT WILL BE TECHNICALLY IMPRACTICABLE TO ACHIEVE AND MAINTAIN THE REMEDIATION LEVELS THROUGHOUT THE AREA OF ATTAINMENT, THE EPA IN CONSULTATION WITH THE COMMONWEALTH OF PENNSYLVANIA, WILL CONSIDER AMENDING THE ROD OR ISSUING AN EXPLANATION OF SIGNIFICANT DIFFERENCES (ESD) TO INFORM THE PUBLIC OF ALTERNATIVE GROUND WATER CLEAN UP LEVELS.

(5) LANDFILL GAS VENTING SYSTEM AND INSTALLATION OF GAS PROBES

A LANDFILL GAS VENTING SYSTEM SHALL BE INSTALLED IN THE VICINITY OF THE BOSER RESIDENCE TO MINIMIZE THE POTENTIAL FOR LANDFILL GAS MIGRATION TOWARD THE BOSER HOME. THE NUMBER OF GAS VENTS SHALL BE DETERMINED DURING THE REMEDIAL DESIGN. THE LANDFILL GAS VENTING SYSTEM SHALL MEET THE REQUIREMENTS UNDER 25 PA. CODE CHAPTER 127, AND SPECIFICALLY SECTION 127.12(A)(5) FOR NEW AIR EMISSION SOURCES.

TO MONITOR THE POTENTIAL OCCURENCE OF LANDFILL GAS MIGRATION IN THE NORTHEASTERN PORTION OF AREA #3, PERIMETER GAS MONITORING PROBES SHALL BE INSTALLED THE SAME TIME THE SOIL COVER IS INSTALLED. THESE GAS MONITORING PROBES SHALL BE TESTED QUARTERLY FOR 30 YEARS OR UNTIL EPA DETERMINES THAT NO GAS MONITORING IS NECESSARY.

(6) VAULT SEDIMENT REMOVAL WITH OFFSITE DISPOSAL

THE ACCUMULATED SEDIMENT FROM THE CONCRETE COLLECTION VAULTS LOCATED AT THE WEST SEEP SHALL BE COMPLETELY REMOVED AND DISPOSED OF AT AN OFFSITE PERMITTED FACILITY. PRIOR TO DISPOSAL, TCLP TESTING SHALL BE CONDUCTED ON THE SEDIMENT. IF THE SEDIMENT FAILS THE TCLP PROCEDURE, IT SHALL BE DISPOSED OF AT AN APPROVED OFFSITE RCRA SUBTITLE C FACILITY. IF THE SEDIMENT PASSES THE TCLP PROCEDURE, IT MAY BE DISPOSED OF AT AN EPA AND PADER APPROVED AND PERMITTED SOLID WASTE LANDFILL. SEDIMENT FROM THE CONCRETE COLLECTION VAULTS SHALL CONTINUE TO BE PERIODICALLY REMOVED WHEN THE VAULTS REACH THREE QUARTERS FULL.

(7) CONSTRUCTION OF A PERIMETER FENCE

A PERIMETER FENCE SHALL BE CONSTRUCTED AROUND THE CONCRETE COLLECTION VAULTS LOCATED AT THE WEST SEEP TO PREVENT PUBLIC ACCESS TO THE VAULTS. THIS FENCE SHALL BE MAINTAINED FOR 30-YEARS.

(8) SURFACE WATER/SEDIMENT MONITORING

SURFACE WATER (STREAMS AND SEEPS) AND SEDIMENT (STREAM AND SEEP) MONITORING SHALL BE CONDUCTED FOR 30 YEARS. DURING THE FIRST FIVE YEARS, SAMPLING SHALL BE CONDUCTED SEMI-ANNUALLY DURING BASE FLOW CONDITIONS. THIS DATA SHALL THEN BE EVALUATED BY EPA, IN CONSULTATION WITH PADER, TO DETERMINE IF FURTHER SURFACE WATER AND SEDIMENT SAMPLING IS NECESSARY FOR THE NEXT 25 YEARS. PARAMETERS TO BE MONITORED INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING: VOLATILE ORGANIC COMPOUNDS, SEMI-VOLATILE ORGANIC COMPOUNDS, TAL INORGANICS (METALS), PARTICLE SIZE, AND LEACHATE PARAMETERS.

IN ADDITION, THE SURFACE WATER/SEDIMENT MONITORING PROGRAM WILL INCLUDE A FISH AND MACROBENTHIC INVERTEBRATE STUDY THAT SHALL BE CONDUCTED ONCE A YEAR DURING THE SPRING SEASON FOR A FIVE YEAR PERIOD.

STATUTORY DETERMINATIONS

UNDER ITS LEGAL AUTHORITIES, EPA'S PRIMARY RESPONSIBILITY AT SUPERFUND SITES IS TO UNDERTAKE REMEDIAL ACTIONS THAT ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. IN ADDITION, SECTION 121 OF CERCLA ESTABLISHED SEVERAL OTHER STATUTORY REQUIREMENTS AND PREFERENCES. THESE SPECIFY THAT WHEN COMPLETE, THE SELECTED REMEDIAL ACTION FOR A SITE MUST COMPLY WITH APPLICABLE OR RELEVANT AND APPROPRIATE ENVIRONMENTAL STANDARDS ESTABLISHED UNDER FEDERAL AND STATE ENVIRONMENTAL LAWS UNLESS A STATUTORY WAIVER IS GRANTED. THE SELECTED REMEDY MUST ALSO BE COST-EFFECTIVE AND UTILIZE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE. FINALLY, THE STATUTE INCLUDES A PREFERENCE FOR REMEDIES THAT PERMANENTLY AND SIGNIFICANTLY REDUCE THE VOLUME, TOXICITY, OR MOBILITY OF HAZARDOUS WASTES.

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

THE SELECTED REMEDY WILL BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT BY ELIMINATING THE THREAT POSED BY HAZARDOUS SUBSTANCES WITHIN THE OLD CITY OF YORK LANDFILL. THESE HAZARDOUS SUBSTANCES CURRENTLY POSE A THREAT TO HUMAN HEALTH DUE TO POTENTIAL EXPOSURE TO GROUND WATER AT THE SITE. IMPLEMENTATION OF THIS REMEDY WOULD EFFECTIVELY ELIMINATE THE POTENTIAL RISK TO HUMAN HEALTH WHICH MAY RESULT FROM EXPOSURE TO GROUND WATER FROM THE SITE AND RESTORE GROUND WATER AT THE SITE TO BENEFICIAL USES. THE SELECTED REMEDY WOULD EFFECTIVELY MINIMIZE THE POTENTIAL FOR EXPOSURE TO LANDFILL REFUSE BY RESTORING THE SOIL COVER IN THE NORTHEASTERN PORTION OF AREA #3. THE SELECTED REMEDY WOULD ALSO ELIMINATE THE POTENTIAL RISK TO AQUATIC ORGANISMS FROM A SUDDEN DISCHARGE OF SEDIMENT FROM THE COLLECTION VAULTS AT THE WEST SEEP. BECAUSE THE SELECTED REMEDY WOULD RESULT IN HAZARDOUS SUBSTANCES REMAINING ONSITE, 5-YEAR SITE REVIEWS, PURSUANT TO SECTION 121(C) OF CERCLA, 42 USC S 9621(C), WOULD BE REQUIRED TO MONITOR THE EFFECTIVENESS OF THIS ALTERNATIVE.

THE SELECTED REMEDY WILL NOT POSE ANY UNACCEPTABLE SHORT-TERM RISKS OR CROSS-MEDIA IMPACTS TO THE SITE, THE WORKERS, OR THE COMMUNITY. THE SELECTED REMEDY WILL BE READILY IMPLEMENTABLE.

COMPLIANCE WITH ARARS

THE SELECTED REMEDY WILL ATTAIN ALL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR THE SITE. THESE REQUIREMENTS ARE SHOWN IN APPENDIX A. MOST SPECIFICALLY, THE PENNSYLVANIA ACTION-SPECIFIC REQUIREMENT TO REMEDIATE GROUND WATER TO BACKGROUND CONCENTRATIONS (25 PA CODE, CHAPTER 75, PART 264.97) WILL BE MET THROUGH IMPLEMENTATION OF THIS REMEDY. IF IMPLEMENTATION OF THE SELECTED REMEDY DEMONSTRATES, IN CORROBORATION WITH HYDROGEOLOGICAL AND CHEMICAL EVIDENCE, THAT IT WILL BE TECHNICALLY IMPRACTICABLE TO ACHIEVE AND MAINTAIN THE REMEDIATION GOALS THROUGHOUT THE AREA OF ATTAINMENT, THE EPA IN CONSULTATION WITH THE COMMONWEALTH OF PENNSYLVANIA, WILL CONSIDER AMENDING THE ROD OR ISSUING AN EXPLANATION OF SIGNIFICANT

DIFFERENCES (ESD) TO INFORM THE PUBLIC OF ALTERNATIVE GROUND WATER GOALS.

#### COST EFFECTIVENESS

THE ESTIMATED PRESENT WORTH COST OF THE SELECTED REMEDY IS \$8,000,000. EPA BELIEVES THE SELECTED REMEDY IS COST EFFECTIVE IN MITIGATING THE RISKS POSED BY THE OLD CITY OF YORK LANDFILL SITE. ALTHOUGH THE NO-FURTHER ACTION ALTERNATIVE CAN BE IMPLEMENTED AT A MUCH LOWER COST, THAT ALTERNATIVE IS NOT PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND DOES NOT MEET ARARS.

UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

EPA HAS DETERMINED THAT THE SELECTED REMEDIAL ACTION REPRESENTS THE MAXIMUM EXTENT TO WHICH PERMANENT SOLUTIONS AND TREATMENT TECHNOLOGIES CAN BE UTILIZED WHILE PROVIDING THE BEST BALANCE AMONG THE OTHER EVALUATION CRITERIA. OF THE ALTERNATIVES THAT ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND MEET ARARS, EPA HAS DETERMINED THAT THE SELECTED REMEDY PROVIDES THE BEST BALANCE OF TRADE-OFFS IN TERMS OF LONG-TERM EFFECTIVENESS; REDUCTION IN TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT; STATE AND COMMUNITY ACCEPTANCE; AND THE CERCLA PREFERENCE FOR TREATMENT.

THE SELECTED REMEDY ADDRESSES THE LONG-TERM, LOW-LEVEL THREATS POSED BY THE SITE CONTAMINANTS AT THE OLD CITY OF YORK LANDFILL. THE REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, MEETS ARARS, AND IS COST-EFFECTIVE. TREATMENT AS A PRINCIPAL ELEMENT IS PROVIDED FOR IN THE ONSITE TREATMENT OF EXTRACTED GROUND WATER PRIOR TO DISCHARGE.

#ESC

#### EXPLANATION OF SIGNIFICANT CHANGES

THE PROPOSED PLAN FOR THE OLD CITY OF YORK LANDFILL SITE WAS RELEASED IN JULY 1991. THE PROPOSED PLAN DESCRIBED THE ALTERNATIVES STUDIED IN DETAIL IN THE FEASIBILITY STUDY, AND EPA REVIEWED ALL WRITTEN AND VERBAL COMMENTS SUBMITTED DURING THE COMMENT PERIOD AND AT THE PUBLIC MEETING. UPON REVIEW OF THESE COMMENTS, IT WAS DETERMINED THAT NO SIGNIFICANT CHANGES TO THE REMEDY, AS PRESENTED IN THE PROPOSED PLAN, WERE NECESSARY.